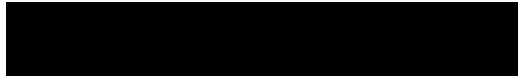


EXHIBIT 2



**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

TQ DELTA, LLC,

Plaintiff,

v.

COMMSCOPE HOLDING COMPANY, INC.,
COMMSCOPE INC., ARRIS US HOLDINGS,
INC., ARRIS SOLUTIONS, INC., ARRIS
TECHNOLOGY, INC., and ARRIS
ENTERPRISES, LLC,

Defendants.

Civil Action No. 2:21-cv-00310-JRG

COMMSCOPE’S PRELIMINARY INVALIDITY CONTENTIONS

Pursuant to Rule 3-3 of the Local Patent Rules (“P. R.”) of the Eastern District of Texas, Defendants CommScope Holding Company, Inc., CommScope, Inc., ARRIS US Holdings, Inc., ARRIS Solutions, Inc., ARRIS Technology, Inc., and ARRIS Enterprises, LLC (collectively, “CommScope” or “Defendants”) hereby provide their Invalidity Contentions with respect to the claims identified by Plaintiff TQ Delta, LLC in its Disclosure of Asserted Claims and Infringement Contentions and Accompanying Document Production, served on November 4, 2021.

I. PRELIMINARY STATEMENT

In its Disclosure of Asserted Claims and Infringement Contentions, the asserted claims identified in Plaintiff’s cover pleading did not match the claims in the attached exhibits mapping the claims of the patents to the alleged infringing instrumentalities. CommScope made a reasonable effort to determine which claims TQ Delta was asserting and reserves the right to

update these invalidity contentions if TQ Delta identifies additional asserted claims. An identification of asserted claims against CommScope is provided below.

Family	Patent	Asserted Claims
EDTX – Family 1	8,468,411	10, 11, 17, 18, 19 and 25
	9,094,348	1, 2, 3, 4, 9, 10, 11, and 12
	9,485,055	11, 17, and 19
	10,833,809	1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 20, 22, 23, 24, 25, and 27
EDTX – Family 2	8,937,988	16 and 22
	9,154,354	10, 11, and 12
DDE – Family 1	7,570,686	17, 18, 19, 36, 37, 38, and 40
DDE – Family 2	7,453,881	17, 18, 21, 23, 25, 26, 29, 31, 33, 34, 37, and 38
DDE – Family 3	7,844,882	9, 13, 14, and 15
	8,276,048	1, 5, 6, and 7
DDE – Family 4	8,090,008	14
DDE – Family 6	8,462,835	8, 10, 24, and 26
	10,567,112	8, 10, 11, 12, and 14

Pursuant to P. R. 3-3 and 3-4, CommScope hereby provides its invalidity disclosures and related documents pertaining to the asserted claims as identified by TQ Delta in its respective Infringement Contentions and as disclosed in the above table. With respect to each asserted claim and based on its investigation to date, CommScope hereby: (a) identifies each currently known item of prior art that either anticipates or renders obvious each asserted claim; (b) specifies whether such prior art anticipates each asserted claim or renders it obvious; (c) submits a chart identifying where each element in each asserted claim is disclosed, described, or taught in the prior art,

including for each element that is governed by 35 U.S.C. § 112 ¶ 6, the identity of the structure(s), act(s), or material(s) in each item of prior art (if any) that performs the claimed function; and (d) identifies the grounds for invalidating asserted claims based on indefiniteness under 35 U.S.C. § 112 ¶ 2, enablement or written description under 35 U.S.C. § 112 ¶ 1. CommScope further relies on and incorporates all prior art references cited in the asserted patents and their respective prosecution histories. CommScope further relies on and incorporates by reference, as if originally set forth herein, all invalidity positions, and all associated prior art and claim charts, disclosed to TQ Delta by present or former defendants in any lawsuits or other proceedings¹ or by potential or actual licensees to any of the asserted claims.

In addition, based on its investigation to date, CommScope hereby produces the documents currently in its possession, custody, or control required to accompany these Invalidity Contentions pursuant to P. R. 3-4.

Discovery has just begun. These contentions are made to the best of CommScope's knowledge and understanding, which may change as facts and evidence are made available to it. Therefore, CommScope reserves the right to seek relief to amend and supplement these

¹ These lawsuits and proceedings include, but are not limited to, *TQ Delta, LLC v. Nokia Corporation et al.*, No. 2:21-cv-00309-JRG (E.D. Tex. filed August 13, 2021); *TQ Delta, LLC v. 2Wire, Inc.*, No. 1:13-cv-01835-RGA (D. Del. filed November 4, 2013); *ADTRAN Inc. v. TQ Delta, LLC*, No. 1:15-cv-00121-RGA (D. Del. filed July 17, 2014); *TQ Delta LLC v. ADTRAN Inc.*, No. 1:14-cv-00954-RGA (D. Del. filed July 17, 2014); *ADTRAN, Inc. v. TQ Delta, LLC*, No. 5:24-cv-01381-JEO (N.D. Ala. filed July 17, 2014); *TQ Delta v. ZyXEL Comms. Corp. et al.*, No. 1:13-cv-02013-RGA (D. Del. filed December 9, 2013); *TQ Delta, LLC v. Pace Ams., LLC et al.*, No. 1:13-cv-01835-RGA (D. Del. filed November 4, 2013); *TQ Delta, LLC v. Zhone Techs. Inc.*, No. 1:13-cv-01836-RGA (D. Del. filed November 4, 2013); *2Wire, Inc. v. TQ Delta, LLC*, No. IPR2015-00239 (P.T.A.B. filed on November 7, 2014); *2Wire, Inc. v. TQ Delta, LLC*, No. IPR2015-00240 (P.T.A.B. filed on November 7, 2014); *2Wire, Inc. v. TQ Delta, LLC*, No. IPR2015-00241 (P.T.A.B. filed on November 7, 2014); *2Wire, Inc. v. TQ Delta, LLC*, No. IPR2015-00242 (P.T.A.B. filed on November 7, 2014); *2Wire, Inc. v. TQ Delta, LLC*, No. IPR2015-00243 (P.T.A.B. filed on November 7, 2014); *2Wire, Inc. v. TQ Delta, LLC*, No. IPR2015-00247 (P.T.A.B. filed on November 7, 2014).

contentions. In addition, the parties have vastly different interpretations of the asserted claims in this litigation. Indeed, CommScope maintains that none of its accused products infringe any of the asserted claims under a proper reading of the claims which include many narrowing claim terms. TQ Delta, for its part, however, advances overly broad readings of the claims in order to maintain its misguided infringement reads. CommScope reserves all rights with respect to the pending infringement claims, including that they are being brought in bad faith and that this case is exceptional.

Nevertheless, to accommodate the vastly differing views of claim scope, these contentions are made to encompass the broader reading offered by TQ Delta as part of its infringement case. CommScope also notes that, under the proper reading of the claims, the asserted claims are still invalid in view of at least some of the art charted in these materials.

No matter, any comparison of a claim term to the prior art expressly or implicitly using a construction offered by TQ Delta (in this or another case) is not a concession or admission to the correctness of that construction, and is simply done out of an abundance of caution in the event that such construction is adopted. Likewise, for any claim term CommScope contends to be indefinite, any comparison of that claim term to the prior art is not a concession that the term is definite, and instead is simply done out of an abundance of caution.

All pin cites throughout these contentions are exemplary in nature. CommScope reserves the right to rely on supplemental citations and authorities to supplement all arguments made herein. CommScope also reserves the right to rely on additional citations to reply to any unforeseen rebuttals TQ Delta may make.

II. IDENTIFICATION OF PRIOR ART PURSUANT TO P. R. 3-3(A)

Pursuant to P. R. 3-3(a), and subject to CommScope's reservation of rights, CommScope identifies each item of prior art that anticipates or renders obvious one or more of the asserted

claims. The sections below contain tables which identify each prior art publication in accordance with P. R. 3-3(a).

III. INVALIDITY CONTENTIONS FOR EDTX – FAMILY 1

A. INVALIDITY UNDER 35 U.S.C. § 102 AND/OR 35 U.S.C. § 103

In accordance with P. R. 3-3(b) and (c), claims 10, 11, 17, 18, 19 and 25 of the '411 Patent, claims 1, 2, 3, 4, 9, 10, 11, and 12 of the '348 Patent, claims 11, 17, and 19 of the '055 Patent, and claims 1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 20, 22, 23, 24, 25, and 27 of the '809 Patent (the “EDTX – Family 1 Patents”) are anticipated and/or rendered obvious by at least the following references:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
7,103,096 (B2)	U.S.	9/5/2006	Mitlin
9,455,800 (B2)	U.S.	9/27/2006	Ysebaert
7,657,818 (B2)	U.S.	2/2/2010 (Priority date is 6/22/2005)	Cioffi
8,644,341 (B1)	U.S.	2/4/2014 (Priority date is 9/26/2003)	Petranovich
5,907,563	U.S.	5/25/1999 (Priority date is 5/7/1996)	Takeuchi
7,099,401	U.S.	9/29/2006 (Priority date is 12/15/1999)	Betts

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
7,124,333 (B2)	U.S.	10/17/2006 (Priority date is 11/30/1998)	Fukushima

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
International Telecommunications Union Telecommunications Standardization Sector ("ITU T") Recommendation No. G.992.1 (06/1999), entitled "Asymmetric digital subscriber line (ADSL) transceivers"	6/22/1999	International Telecommunications Union	G.992.1 or G.dmt
ITU-T Recommendation No. G.992.3 (01/2005), entitled "Asymmetric Digital Subscriber Line Transceivers 2 (ADSL2)"	6/13/2005	International Telecommunications Union	G.992.3 or G.dmt.bis
ITU-T Recommendation No. (06/2004), entitled "Very High Speed Digital Subscriber Line Transceivers"	6/13/2004	International Telecommunications Union	G.993.1 or Gvds1
ITU-T Study Group 15 Temporary Document No. BI 089, entitled "G.gen: ARQ for ADSL Transceivers"	10/27/2000	International Telecommunications Union	BI-089

The patents, publications, and references identified above qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g). The charts identified as Exhibits A-01 through A-08, B-01 through B-08, C-01 through C-07, and D-01 through D-08 demonstrate how the asserted claims of the EDTX – Family 1 Patents are anticipated and/or rendered obvious by the references above. Each chart identifies certain prior art to the asserted claims of the EDTX – Family 1 Patents and identifies at least one citation in the prior art reference where each claim element of the asserted claims is disclosed. Though the charts provide illustrative citations to where each claim element may be found in the prior art, the cited references may contain additional disclosures of each claim element as well, and CommScope reserves the right to assert that any claim element is disclosed in other portions of the cited references. In addition, CommScope identifies, and incorporates here by reference, all prior art of record in the prosecution history of the EDTX – Family 1 Patents (and all related patents and applications), and all prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups' publications, reports, or specifications), any of which may anticipate and/or render the asserted claims of the EDTX – Family 1 Patents obvious. Further, CommScope identifies any TQ Delta patents that claim the same priority date as the EDTX – Family 1 Patents and disclose the same subject matter and for which a terminal disclaimer was not filed during prosecution, under the doctrine of obviousness-type double patenting. Additional evidence regarding the features and elements of prior art references may be provided by witness testimony, or by additional documents and materials describing the prior art, that may be identified through the course of ongoing discovery and investigation.

To the extent that a reference above is found to be missing a limitation of the asserted claims of the EDTX – Family 1 Patents, any one of the prior art references identified above may

be combined with any one or more of the other references identified above to render the asserted claims of the EDTX – Family 1 Patents obvious under 35 U.S.C. § 103. CommScope reserves the right to rely on the references listed above for motivation to combine, the state of the art and/or the background knowledge of one of ordinary skill in the art.

In addition, any of the foregoing anticipatory or secondary prior art references listed above may be combined with any of the prior art of record in the prosecution history of the EDTX – Family 1 Patents (and all related patents and applications), or with any prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups’ publications, reports or specifications), to render the asserted claims of the EDTX – Family 1 Patents obvious. Further, any of the foregoing prior art listed above may be combined with one another to render the asserted claims of the EDTX – Family 1 Patents obvious.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts. The Supreme Court identified in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007), a number of rationales that would support a finding that the asserted claims are obvious:

- A. the Asserted Claims combine prior art elements according to known methods to yield predictable results;
- B. the Asserted Claims involve the simple substitution of one known element for another to obtain predictable results;
- C. the Asserted Claims involve the use of a known technique to improve similar devices (methods, or products) in the same way;
- D. the Asserted Claims apply a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- E. the Asserted Claims involve combinations of prior art references that would have been “obvious to try”—i.e., a person of ordinary skill in the art could have reached the Asserted Claims by choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

- F. the Asserted Claims are simply variations of work from one field of endeavor or a different one that would have been prompted based on design incentives or other market forces because the variations were predictable to one of ordinary skill in the art.

KSR, 550 U.S. at 414–18 (rejecting Federal Circuit’s “rigid” application of motivation-to-combine test, and instead espousing “expansive and flexible” approach); *see also* Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg. 57,526 (Oct. 10, 2007). The Supreme Court has also held that a person of ordinary skill in the art is “a person of ordinary creativity, not an automaton,” that a motivation to combine may be simply “common sense,” and that “familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *KSR*, 550 U.S. at 420–21. The Supreme Court further held that it is sufficient that a combination of elements was “obvious to try,” holding that, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.” *Id.* at 421. Further, the Federal Circuit has held that a motivation to combine references may be implicit for patents based on improvements. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006). The prior art references identified herein are almost universally within the field of the asserted patents and are directed to similar subject matter within that field. Additionally, any products, devices, or processes described in the references existed and/or were invented before or during the period in which the claimed inventions were developed, providing further motivation to combine them. CommScope reserves the right to rely on forthcoming testimony in this litigation.

To the extent TQ Delta challenges a combination of prior art with respect to a particular element, CommScope reserves all rights to supplement these contentions to further specify the motivation to combine the prior art. CommScope may rely on cited or uncited portions of the prior art, other documents, and/or expert testimony to establish that a person of ordinary skill in the art would have been motivated to modify or combine the prior art so as to render the claims invalid as obvious.

One of ordinary skill in the art would have been motivated to combine one or more of the prior art references identified above to arrive at the combination of elements recited in each of the asserted claims of the EDTX – Family 1 Patents. The suggestion or motivation to modify or combine references for obviousness purposes is provided by the explicit and implicit teachings of the prior art identified by CommScope, the knowledge of one of ordinary skill in the art, and/or the nature of the claimed invention and the problem(s) purportedly being solved. As an initial matter, CommScope notes that each prior art reference is in or relates to the same field, high-speed communications, and more specifically, DSL networks. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field or endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. The combination of prior art references identified in these contentions would have been obvious because the combinations represent the known potential options with a reasonable expectation of success. Additionally, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art

generally. Also, market forces in the industry and the desire to improve features and performance would motivate the addition of features to systems as they become available; become smaller; become less expensive; become more commonly used; provide better performance; reduce costs; size or weight; or predictably achieve other clearly desirable results. For example, a person of ordinary skill in the art of data transmission knew error correction techniques, such as forward error correction and interleaving techniques, could be combined with data retransmission techniques, such as automatic repeat request protocols, long before the invention date—April 12, 2006—associated with the asserted claims of the EDTX – Family 1 Patents. *See, e.g.*, BI-089, Introduction (publicly available no later than **October 27, 2000** (emphasis added)). Such a combination would have been motivated by the goals of improving performance and other functionalities of data transmission technology, such as DSL, and bolstering protections against data transmission errors. *Id.* The preceding motivation to combine references is exemplary only, and should not be used to limit these disclosures. There would have been substantial motivation to combine the prior art references prior to the invention date of April 12, 2006, and CommScope reserves the right to and intends to supplement the foregoing with expert and other testimony. More detailed bases for the motivation to combine specific references will be set forth in CommScope’s expert report(s) on invalidity following claim construction and discovery on validity issues.

To the extent that TQ Delta raises any secondary considerations of non-obviousness, for example, in its expert reports, CommScope reserves the right to address any such considerations.

B. INVALIDITY UNDER 35 U.S.C. § 112

CommScope lists below exemplary grounds upon which it contends the asserted claims of the EDTX – Family 1 Patents are invalid for failure to meet one or more requirements of 35 U.S.C. § 112. A more detailed basis for CommScope’s written description, enablement, and

indefiniteness defenses will be set forth in CommScope’s expert report(s) on invalidity. CommScope reserves the right to supplement and/or amend these contentions based on § 112 in light of discovery on invalidity issues and on any other basis permitted by the Court or the applicable rules. Such supplementation and/or amendments may include, but are not limited to, invalidity contentions based on indefiniteness, lack of written description, and/or lack of enablement.

1. Invalidity Under 35 U.S.C. § 112 ¶ 1

35 U.S.C. § 112 ¶ 1 requires that the specification contain a written description of the invention. “[T]he hallmark of written description is disclosure.” *Boston Scientific Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361–62 (Fed. Cir. 2011) (citation omitted). The test for whether a specification adequately describes an invention is “whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. . . . [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. . . . [I]t is a question of fact.” *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Boston Scientific*, 647 F.3d at 1362.

The enablement requirement of § 112 demands that the patent specification enable “those skilled in the art to make and use the full scope of the claimed invention without ‘undue experimentation.’” *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). “[T]he scope of the claims must be less than or equal to the scope of the enablement.” *Nat’l Recovery Tech., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999).

The asserted claims of the EDTX – Family 1 Patents are invalid because the patent specification does not include sufficient description of the subject matter claimed, and the manner

and process of using it, in such full, clear, concise, and exact terms as to enable any person of ordinary skill in the art to which it pertains to make and use the claimed subject matter without undue experimentation. CommScope further contends that the full scope of each asserted claim was not described with particularity in the specification to which priority is apparently sought, thereby setting forth insufficient detail to allow one of ordinary skill in the art to understand what is claimed and to recognize that the inventor(s) invented what is claimed. By way of example, and without limitation, at least the following elements are not enabled and/or fail to meet the written description requirement of § 112:

- “wherein the first type of packet comprises one or more PTM-TC (Packet Transfer Mode-Transmission Convergence) codewords” (’055 Patent, claim 17)
- “wherein the packet comprises a header field and a plurality of PTM-TC codewords, a plurality of ATM cells or a plurality of Reed-Solomon codewords, and” (’348 Patent, claim 1)
- “wherein the packet comprises a header field and a plurality of PTM-TC codewords, a plurality of ATM cells or a plurality of Reed-Solomon codewords, and” (’348 Patent, claim 9)
- “wherein the transmitted messages have a higher immunity to noise than the received packet” (’348 Patent, claim 2)
- “wherein the received messages have a higher immunity to noise than the transmitted packet” (’348 Patent, claim 10)
- “wherein the transmitted message has a higher immunity to noise than the received packet” (’809 Patent, claim 9)
- “wherein the received message has a higher immunity to noise than the transmitted

packet” (’809 Patent, claim 16)

- “wherein the transmitted message has a higher immunity to noise than the received packet” (’809 Patent, claim 23)

The asserted claims of the EDTX – Family 1 Patents (and all other claims in the asserted patents that include or depend from any claims that include any of the above limitations) are invalid because they fail to meet the enablement and/or written description requirements of § 112.

The accused products do not infringe the asserted claims of the EDTX – Family 1 Patents based on a proper interpretation of the scope of those claims. To the extent the asserted claims of the EDTX – Family 1 Patents may eventually be construed so broadly as to cover the accused products, such a construction (or constructions) would render asserted claims of the EDTX – Family 1 Patents invalid for failure to meet the requirements of § 112 ¶ 1.

2. Invalidity Under 35 U.S.C. § 112 ¶ 2

Claims are indefinite under 35 U.S.C. § 112 ¶ 2 when they “fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). To the extent an asserted apparatus claim includes both apparatus and method limitations, that claim is invalid for indefiniteness under § 112 ¶ 2 because it fails to identify or notify the public of what constitutes direct infringement. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1383-84 (Fed. Cir. 2005).

The asserted claims of the EDTX – Family 1 Patents are also invalid because they fail to particularly point out and distinctly claim the subject matter that the purported inventors claimed (i.e., the claims are indefinite). A person of ordinary skill in the art to which the purported invention pertains would not understand the scope of each asserted claim when read in light of the specification. By way of example, and without limitation, at least the following claim terms are indefinite under § 112:

- “a multicarrier transceiver including a processor and memory operable to:” (’348 Patent, claim 1)
- “wherein the transceiver is operable to retransmit the packet using the forward error correction encoder and the interleaver” (’348 Patent, claim 3)
- “a multicarrier transceiver including a processor and memory operable to:” (’348 Patent, claim 9)
- “wherein the transceiver is operable to receive a retransmitted packet using the forward error correction decoder and the deinterleaver” (’348 Patent, claim 11)
- “A transceiver operable” (’055 Patent, claim 11)

The asserted claims of the EDTX – Family 2 Patents (and all other claims in the asserted patent that include or depend from any claims that include any of the above limitations) are invalid because they fail to particularly point out and distinctly claim the subject matter that the applicants regarded as their invention.

IV. INVALIDITY CONTENTIONS FOR EDTX – FAMILY 2

A. INVALIDITY UNDER 35 U.S.C. § 102 AND/OR 35 U.S.C. § 103

In accordance with P. R. 3-3(b) and (c), claims 16 and 22 of the ’988 Patent and claims 10-12 of the ’354 Patent (the “EDTX – Family 2 Patents”) are anticipated and/or rendered obvious by at least the following references:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,516,027	U.S.	2/4/2004 (application filed 2/18/1999)	Kapoor

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,084,917	U.S.	7/4/2000 (application filed 12/16/1997)	Kao
WIPO PCT International Publication No. WO 98/52312	W.I.P.O.	11/19/1998	Chow 312
6,205,410	U.S.	10/13/1998 (application filed on 10/13/1998)	Cai
5,790,550	U.S.	8/4/1998	Peeters
6,064,692	U.S.	5/16/2000 (application filed on 6/20/1997)	Chow 692
9,154,354	U.S.	7/24/2001 (§ 102(e) date of February 11, 2000)	Gross
U.S. Provisional Application 60/179539	U.S.	2/1/2000 (date filed)	Subramanian

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Bandwidth optimized digital transmission techniques for spectrally shaped channels with impulse noise	May 1993	P.S. Chow, STANFORD UNIVERSITY	Chow 1993

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
TNETD8000 Very High Bit-Rate Digital Subscriber Line (VDSL) Chipset Hardware and Software Evaluation Module (EVM) User's Guide	November 1999	TEXAS INSTRUMENTS	TNETD8000 User Guide
Providing the Right Solution for VDSL	July 16, 1999	TEXAS INSTRUMENTS, White Paper,	Providing the Right Solution for VDSL

The patents, publications, and references identified above qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g). The charts identified as Exhibits E-01 through E-11 and F-01 through F-07 demonstrate how the asserted claims of the EDTX – Family 2 Patents are anticipated and/or rendered obvious by the references above. Each chart identifies certain prior art to the asserted claims of the EDTX – Family 2 Patents and identifies at least one citation in the prior art reference where each claim element of the asserted claims is disclosed. Though the charts provide illustrative citations to where each claim element may be found in the prior art, the cited references may contain additional disclosures of each claim element as well, and CommScope reserves the right to assert that any claim element is disclosed in other portions of the cited references. In addition, CommScope identifies, and incorporates here by reference, all prior art of record in the prosecution history of the EDTX – Family 2 Patents (and all related patents and applications), and all prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups' publications, reports, or specifications), any of which may anticipate and/or render the asserted claims of the EDTX – Family 2 Patents obvious. Further, CommScope identifies any TQ Delta patents that claim the same priority date as the

EDTX – Family 2 Patents and disclose the same subject matter and for which a terminal disclaimer was not filed during prosecution, under the doctrine of obviousness-type double patenting. Additional evidence regarding the features and elements of prior art references may be provided by witness testimony, or by additional documents and materials describing the prior art, that may be identified through the course of ongoing discovery and investigation.

To the extent that a reference above is found to be missing a limitation of the asserted claims of the EDTX – Family 2 Patents, any one of the prior art references identified above may be combined with any one or more of the other references identified above and the following references, all of which qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g), to render the asserted claims of the EDTX – Family 2 Patents obvious under 35 U.S.C. § 103. CommScope reserves the right to rely on the references listed above for motivation to combine, the state of the art and/or the background knowledge of one of ordinary skill in the art.

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface	August 1995	American National Standards Institute	T1.413-1995
PAR Reduction Without Noise Enhancement	9/22/1997	T1E1.4 Technical Subcommittee Working Group	Djokovic
TL413 Issue 2: Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface	6/5/1998	American National Standards Institute	T1-413-1998

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Complementary Series	April 1961	M.J.E. Golay, IRE Trans. on Information Theory	Golay
A New Phasing Scheme for Multitone Signal Systems to Reduce Peak-to-Average Power Ratio	1997	S. Narahashi and T. Nojima, Elecs. and Commn's in Japan	
A Method to Reduce the Probability of Clipping in DMT-Based Transceivers	October 1996	Mestdagh, D.J.G and P.M.P. Spruyt, IEEE Trans. on Communications	
Reducing the Peak-to-Average Power Ratio of Multicarrier Modulation by Selected Mapping	October 1996	Bauml, R.W. et al., Electronics Letters	
A Novel Peak Power Reduction Scheme for OFDM	1997	Muller, S.H. and J.B. Huber, IEEE	
Network Migration	December 1997	American National Standards Institute	TR-004

Products			
Title	Date of Relevant Publications	Corporation	Short Cite
Virtuoso chipset	4/22/1996, 8/3/1999 12/1/1999, 11/1/1999, 8/13/2002,	Amati Communications Corporation/Texas Instruments	Virtuoso
TNETD8000 chipset	November 1999	Texas Instruments	TNETD8000 chipset

Products			
Title	Date of Relevant Publications	Corporation	Short Cite
TNETD8000 EVM	November 1999	Texas Instruments	TNETD8000 EVM

In addition, any of the foregoing anticipatory or secondary prior art references listed above may be combined with any of the prior art of record in the prosecution history of the EDTX – Family 2 Patents (and all related patents and applications), or with any prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups’ publications, reports or specifications), to render the asserted claims of the EDTX – Family 2 Patents obvious. Further, any of the foregoing prior art listed above may be combined with one another to render the asserted claims of the EDTX – Family 2 Patents obvious.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts. The Supreme Court identified in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007), a number of rationales that would support a finding that the asserted claims are obvious:

- A. the Asserted Claims combine prior art elements according to known methods to yield predictable results;
- B. the Asserted Claims involve the simple substitution of one known element for another to obtain predictable results;
- C. the Asserted Claims involve the use of a known technique to improve similar devices (methods, or products) in the same way;
- D. the Asserted Claims apply a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- E. the Asserted Claims involve combinations of prior art references that would have been “obvious to try”—i.e., a person of ordinary skill in the art could have reached the Asserted Claims by choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

- F. the Asserted Claims are simply variations of work from one field of endeavor or a different one that would have been prompted based on design incentives or other market forces because the variations were predictable to one of ordinary skill in the art.

KSR, 550 U.S. at 414–18 (rejecting Federal Circuit’s “rigid” application of motivation-to-combine test, and instead espousing “expansive and flexible” approach); *see also* Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg. 57,526 (Oct. 10, 2007). The Supreme Court has also held that a person of ordinary skill in the art is “a person of ordinary creativity, not an automaton,” that a motivation to combine may be simply “common sense,” and that “familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *KSR*, 550 U.S. at 420–21. The Supreme Court further held that it is sufficient that a combination of elements was “obvious to try,” holding that, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.” *Id.* at 421. Further, the Federal Circuit has held that a motivation to combine references may be implicit for patents based on improvements. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006). The prior art references identified herein are almost universally within the field of the asserted patents and are directed to similar subject matter within that field. Additionally, any products, devices, or processes described in the references existed and/or were invented before or during the period in which the claimed inventions were developed, providing further motivation to combine them. CommScope reserves the right to rely on forthcoming testimony in this litigation.

To the extent TQ Delta challenges a combination of prior art with respect to a particular element, CommScope reserves all rights to supplement these contentions to further specify the motivation to combine the prior art. CommScope may rely on cited or uncited portions of the prior art, other documents, and/or expert testimony to establish that a person of ordinary skill in the art would have been motivated to modify or combine the prior art so as to render the claims invalid as obvious.

One of ordinary skill in the art would have been motivated to combine one or more of the prior art references identified above to arrive at the combination of elements recited in each of the asserted claims of the EDTX – Family 2 Patents. The suggestion or motivation to modify or combine references for obviousness purposes is provided by the explicit and implicit teachings of the prior art identified by CommScope, the knowledge of one of ordinary skill in the art, and/or the nature of the claimed invention and the problem(s) purportedly being solved. As an initial matter, CommScope notes that each prior art reference is in or relates to the same field, high-speed communications, and more specifically, DSL networks. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field or endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. The combination of prior art references identified in these contentions would have been obvious because the combinations represent the known potential options with a reasonable expectation of success. Additionally, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art

generally. Also, market forces in the industry and the desire to improve features and performance would motivate the addition of features to systems as they become available; become smaller; become less expensive; become more commonly used; provide better performance; reduce costs; size or weight; or predictably achieve other clearly desirable results. For example, one common, known method of handling a difference in delay was to provide an additional buffer or memory of appropriate size. Those in the DSL and high-speed communications industry understood that a decrease in SNR would cause an increase in BER, thus, in order to maintain a particular BER, the number of bits carried would need to be reduced. Therefore, those of ordinary skill in the art at the time of the alleged invention would have understood the importance of regulating SNR across carriers in order to manage the quality of DSL transmissions. The EDTX – Family 2 Patents admit that the use of an SNR margin to help manage SNR across carriers. *See* '354 Patent at 1:20–2:45, '988 Patent at 1:19–2:41. Moreover, those of ordinary skill in the art at the time of the alleged invention understood that SNR could be managed by dividing the signal amongst separate carriers. Those of ordinary skill in the art also understood that managing the SNR maintained or improved the quality of DSL transmissions. For example, Kapoor, Kao and Chow 1993 relate to determining bit allocations for multicarrier communications based, in part on SNR measurements. Additionally, TNETD8000 User Guide discloses a programmable margin in a VDSL system and Providing the Right Solution for VDSL discloses, in part, a VDSL system that allows an operator to configure downstream and upstream data rates for each line. The motivation to combine references is exemplary only, and should not be used to limit these disclosures. There would have been substantial motivation to combine the prior art references prior to the invention date, and CommScope reserves the right to and intends to supplement the foregoing with expert and other testimony. More detailed bases for the motivation to combine specific references will be set forth

in CommScope's expert report(s) on invalidity following claim construction and discovery on validity issues.

To the extent that TQ Delta raises any secondary considerations of non-obviousness, for example, in its expert reports, CommScope reserves the right to address any such considerations.

B. INVALIDITY UNDER 35 U.S.C. § 112

CommScope lists below exemplary grounds upon which it contends the asserted claims of the EDTX – Family 2 Patents are invalid for failure to meet one or more requirements of 35 U.S.C. § 112. A more detailed basis for CommScope's written description, enablement, and indefiniteness defenses will be set forth in CommScope's expert report(s) on invalidity. CommScope reserves the right to supplement and/or amend these contentions based on § 112 in light of discovery on invalidity issues and on any other basis permitted by the Court or the applicable rules. Such supplementation and/or amendments may include, but are not limited to, invalidity contentions based on indefiniteness, lack of written description, and/or lack of enablement.

1. Invalidity Under 35 U.S.C. § 112 ¶ 1

35 U.S.C. § 112 ¶ 1 requires that the specification contain a written description of the invention. “[T]he hallmark of written description is disclosure.” *Boston Scientific Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361–62 (Fed. Cir. 2011) (citation omitted). The test for whether a specification adequately describes an invention is “whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. . . . [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. . . . [It] is a question of fact.” *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Boston Scientific*, 647 F.3d at 1362.

The enablement requirement of § 112 demands that the patent specification enable “those skilled in the art to make and use the full scope of the claimed invention without ‘undue experimentation.’” *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). “[T]he scope of the claims must be less than or equal to the scope of the enablement.” *Nat’l Recovery Tech., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999).

The asserted claims of the EDTX – Family 2 Patents are invalid because the patent specification does not include sufficient description of the subject matter claimed, and the manner and process of using it, in such full, clear, concise, and exact terms as to enable any person of ordinary skill in the art to which it pertains to make and use the claimed subject matter without undue experimentation. CommScope further contends that the full scope of each asserted claim was not described with particularity in the specification to which priority is apparently sought, thereby setting forth insufficient detail to allow one of ordinary skill in the art to understand what is claimed and to recognize that the inventor(s) invented what is claimed. By way of example, and without limitation, at least the following elements are not enabled and/or fail to meet the written description requirement of § 112:

- “receive a first plurality of bits on the first plurality of carriers using a first SNR margin; receive a second plurality of bits on the second plurality of carriers using a second SNR margin;” (’354 Patent, claim 10)
- “and to demodulate for reception a third plurality of bits from the first carrier using a third SNR margin,” (’988 Patent, claim 16)
- “wherein the third SNR margin specifies a third value for an allowable increase in noise without an increase in the bit error rate (BER) associated with said first

carrier,” (’988 Patent, claim 16)

The asserted claims of the EDTX – Family 2 Patents (and all other claims in the asserted patents that include or depend from any claims that include any of the above limitations) are invalid because they fail to meet the enablement and/or written description requirements of § 112.

The accused products do not infringe the asserted claims of the EDTX – Family 2 Patents based on a proper interpretation of the scope of those claims. To the extent the asserted claims of the EDTX – Family 2 Patents may eventually be construed so broadly as to cover the accused products, such a construction (or constructions) would render asserted claims of the EDTX – Family 2 Patents invalid for failure to meet the requirements of § 112 ¶ 1.

2. Invalidity Under 35 U.S.C. § 112 ¶ 2

Claims are indefinite under 35 U.S.C. § 112 ¶ 2 when they “fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). To the extent an asserted apparatus claim includes both apparatus and method limitations, that claim is invalid for indefiniteness under § 112 ¶ 2 because it fails to identify or notify the public of what constitutes direct infringement. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1383–84 (Fed. Cir. 2005).

The asserted claims of the EDTX – Family 2 Patents are also invalid because they fail to particularly point out and distinctly claim the subject matter that the purported inventors claimed (i.e., the claims are indefinite). A person of ordinary skill in the art to which the purported invention pertains would not understand the scope of each asserted claim when read in light of the specification. By way of example, and without limitation, at least the following claim terms are indefinite under § 112:

- “operable to demodulate for reception a first plurality of bits from a first carrier”
(’988 Patent, claim 16)

- “A multicarrier communications transceiver operable to receive a multicarrier symbol comprising a first plurality of carriers” (’354 Patent, claim 10)
- “wherein the first SNR margin provides more robust reception than the second SNR margin” (’354 Patent, claim 10)

The asserted claims of the EDTX – Family 2 Patents (and all other claims in the asserted patent that include or depend from any claims that include any of the above limitations) are invalid because they fail to particularly point out and distinctly claim the subject matter that the applicants regarded as their invention.

V. INVALIDITY CONTENTIONS FOR DDE – FAMILY 1

A. INVALIDITY UNDER 35 U.S.C. § 102 AND/OR 35 U.S.C. § 103

In accordance with P. R. 3-3(b) and (c), claims 17, 18, 19, 36, 37, 38, and 40 of the ’686 Patent (the “DDE – Family 1 Patent”) are anticipated and/or rendered obvious by at least the following references:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,445,730	U.S.	9/3/2002	Greszczuk
6,631,120	U.S.	10/7/2003	Milbrandt
6,636,603	U.S.	10/21/2003	Milbrandt 603
6,606,719	U.S.	8/12/2003	Ryckebusch
6,434,119	U.S.	8/13/2002	Wiese
6,865,232	U.S.	3/8/2005	Isaksson
6,219,378	U.S.	4/17/2001	Wu
4,679,227	U.S.	7/7/1987	Hughes-Hartogs

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,788,705	U.S.	9/7/2004	Rango
6,366,644	U.S.	4/2/2002	Sisk
4,438,511	U.S.	3/20/1984	Baran
GB 2,300,546	U.K.	6/11/1996	Bae
5,838,268	U.S.	11/17/1998	Frenkel
6,549,512	U.S.	4/15/2003	Wu 512
5,490,199	U.S.	2/6/1996	Fuller 199
5,299,257	U.S.	3/29/1994	Fuller 257

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
ANSI T1.413-1998, Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface	6/5/1998	American National Standards Institute	T1.413-1998
Asymmetric digital subscriber line transceivers	6/22/1999	International Telecommunications Union	G.992.1
Telebit T2500 Reference Manual	1990	Telebit Corporation	T2500
Data Communications Networking Devices: Operation, Utilization and Lan and Wan	January 1999	Wiley	Held

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Internetworking, 4th Edition			

The patents, publications, and references identified above qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g). The charts identified as Exhibits G-01 through G-22 demonstrate how the asserted claims of the DDE – Family 1 Patent are anticipated and/or rendered obvious by the references above. Each chart identifies certain prior art to the DDE – Family 1 Patent and identifies at least one citation in the prior art reference where each claim element of the asserted claims is disclosed. Though the charts provide illustrative citations to where each claim element may be found in the prior art, the cited references may contain additional disclosures of each claim element as well, and CommScope reserves the right to assert that any claim element is disclosed in other portions of the cited references. In addition, CommScope identifies, and incorporates here by reference, all prior art of record in the prosecution history of the '686 Patent (and all related patents and applications), and all prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups' publications, reports, or specifications), any of which may anticipate and/or render the asserted claims of DDE – Family 1 obvious. Further, CommScope identifies any TQ Delta patents that claim the same priority date as the DDE – Family 1 Patent and disclose the same subject matter and for which a terminal disclaimer was not filed during prosecution, under the doctrine of obviousness-type double patenting. Additional evidence regarding the features and elements of prior art references may be provided by witness testimony, or by additional documents and

materials describing the prior art, that may be identified through the course of ongoing discovery and investigation.

To the extent that a reference above is found to be missing a limitation of the asserted claims of the DDE – Family 1 Patent, any one of the prior art references identified above may be combined with any one or more of the other references identified above and the following references, all of which qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g), to render the asserted claims of the DDE – Family 1 Patent obvious under 35 U.S.C. § 103:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
5,862,451	U.S.	1/22/1996	Grau
6,590,893	U.S.	7/8/2003	Hwang
6,064,692	U.S.	5/16/2000	Chow
6,144,696	U.S.	11/11/2007	Shively
6,606,719	U.S.	8/12/2003	Ryckebusch
6,219,378	U.S.	4/17/2001	Wu
6,631,120	U.S.	10/7/2003	Milbrandt
4,679,227	U.S.	7/7/1987	Hughes-Hartogs
5,838,268	U.S.	11/17/1998	Frenkel
4,438,511	U.S.	3/20/1984	Baran
5,910,970	U.S.	6/8/1999	Lu
6,072,779	U.S.	6/6/2000	Tzannes
6,252,900	U.S.	6/26/2001	Liu
6,253,060	U.S.	6/26/2001	Komara

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,363,128	U.S.	3/26/2002	Isaksson 128
6,438,174	U.S.	8/20/2002	Isaksson 174
6,442,211	U.S.	8/27/2002	Hampel
6,633,545	U.S.	10/14/2003	Milbrandt 545
6,636,603	U.S.	10/21/2003	Milbrandt 603
6,686,879	U.S.	2/3/2004	Shattil
6,801,570	U.S.	10/5/2004	Yong
6,829,307	U.S.	12/7/2004	Hoo
6,847,702	U.S.	1/25/2005	Czerwiec
6,892,339	U.S.	5/10/2005	Polk
7,042,900	U.S.	5/9/2006	Czerwiec 900
5,533,008	U.S.	7/2/1996	Grube
6,459,678	U.S.	10/1/2002	Herzberg
7,336,627	U.S.	2/26/2008	Hasegawa
6,266,347	U.S.	7/24/2001	Amrany
6,424,674	U.S.	7/23/2002	Linz
6,493,395	U.S.	12/10/2002	Isaksson 395
6,456,649	U.S.	9/24/2002	Isaksson 649
6,366,554	U.S.	4/2/2002	Isaksson 554
6,005,893	U.S.	12/21/1999	Hyll
5,521,906	U.S.	5/28/1996	Grube 906
6,697,626	U.S.	2/24/2004	Edison

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,359,926	U.S.	3/19/2002	Isaksson 926
6,052,411	U.S.	4/18/2000	Mueller
7,570,686	U.S.	8/4/2009	Krinsky 686
7,835,430	U.S.	11/16/2010	Krinsky 430
7,889,784	U.S.	2/15/2011	Krinsky 784
8,238,412	U.S.	8/7/2012	Krinsky 412
8,432,956	U.S.	4/30/2013	Krinsky 956
5,128,619	U.S.	7/7/1992	Bjork
WO 1999/063427	W.I.P.O.	12/9/1999	Eichen
4,566,100	U.S.	1/21/1986	Mizuno
6,175,934	U.S.	1/16/2001	Hershey
6,512,789	U.S.	1/28/2003	Mirfakhrai
5,608,643	U.S.	3/4/1997	Wichter
WO 1999/026375	W.I.P.O.	5/27/1999	Hakanson
6,725,176	U.S.	4/20/2004	Long
5,864,602	U.S.	1/26/1999	Needle
5,964,891	U.S.	10/12/1999	Caswell
6,449,307	U.S.	9/10/2002	Ishikawa
6,064,692	U.S.	5/16/2000	Chow
WO 1997/001900	W.I.P.O.	1/16/1997	Johann
EP 0820168	E.U.	1/21/1998	Wu 168
6,177, 801	U.S.	1/23/2001	Chong

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
4,833,706	U.S.	5/23/1989	Hughes-Hartogs 706
5,790,550	U.S.	8/4/1998	Peeters 550
5,793,759	U.S.	8/11/1998	Rakib
6,646,994	U.S.	11/11/2003	Hendrichs
6,748,212	U.S.	6/8/2004	Schmutz
6,891,803	U.S.	5/10/2005	Chang
6,898,185	U.S.	5/24/2005	Agazzi
7,120,122	U.S.	10/10/2006	Starr
5,694,466	U.S.	12/2/1997	Xie
5,438,329	U.S.	8/1/1995	Gastouniotis
5,812,786	U.S.	9/22/1998	Seazholtz
WO 2000/072583	W.I.P.O.	11/30/2000	Birnbaum
WO 1998/10546 (A2)	W.I.P.O.	3/12/1998	Isaksson 546
WO 1999/18701 (A1)	W.I.P.O.	4/15/1999	Henderson 701
EP 0486229	E.U.	5/20/1992	Linguist
EP 0815655	E.U.	1/7/1998	Leitch
EP 0820168	E.U.	1/21/1998	Wu 168
EP 0957615	E.U.	11/17/1999	Polley
EP 0905948	E.U.	3/31/1999	Levin
EP 1119775	E.U.	8/1/2001	Palm
CA 2270721A1	Canada	11/6/1999	Knittel

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
GB 2319703A	U.K.	5/27/1998	Fortier

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Asymmetric digital subscriber line transceivers	6/22/1999	International Telecommunications Union	G.992.1
ANSI T1.413-1998, Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface	6/5/1998	American National Standards Institute	T1.413-1998
ANSI T1.413-1995, “Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface”	1995	American National Standards Institute	T1.413-1995
Data Communications Networking Devices: Operation, Utilization and Lan and Wan Internetworking, 4th Edition	January 1999	Wiley	Held
Providing the Right Solution for VDSL”	July 1999	Texas Instruments	Jacobsen
TR-024: DMT Line Code Specific MIB	June 1999	Broadband Forum: Technical Report	TR-024
Network Migration	December 1997	American National Standards Institute	TR-004

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Wireless Multiple Access Adaptive Communications Techniques	1999	G. Pottie, University of California, Los Angeles	Pottie
Performance Evaluation of a Multichannel Transceiver System for ADSL and VHDSL Services	August 1991	P.S. Chow, IEEE Journal on Selected Areas in Communications	Chow
Comparison of Single-Carrier and Multitone Digital Modulation for ADSL Applications	November 1998	IEEE Communications Magazine	Saltzberg
ATM over ADSL probe in a Telecom Italia environment	December 2000	Computer Networks	Milanovic
Synchronization in ADSL Modems	December 1998	Lund Institute of Technology	Cordes
The HDSL Environment	August 1991	IEEE Journal on Selected Areas in Communications	Werner
Telebit T1000 Reference Manual – 900062-02 Rev. E	January 1990	Telebit Corporation	T1000
Fast-lane Modems	1985	J. Schefter, Popular Science	Fast-lane Modems
TrailBlazer: High-Speed Standalone Modem for Dial-Up Communications		Telebit Corporation	
Packetized Ensemble Modem: Firmware Release 3 Commands and Registers Reference Manual	October 1987	Telebit Corporation	

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Inventing the Internet again	1997	Discovery Institute	
Telebit Introduces Asynchronous Error Correcting Modem	1985	Computerworld	
Telebit Multicarrier Modem Supports 19.2kbps Data Rate	1989	S. Mace, Info World	
9,600-BPS Modems: Breaking the Speed Barrier	1990	M. Byrd, PC Magazine	
High Bit Rate Digital Subscriber Line: A Copper Bridge to the Network of the Future	1991	W. Walkoe and T. J. J. Starr, IEEE Journal on Selected Areas in Communications	
Discrete Multitone Transceiver System for HDSL Applications	1991	J. S. Chow, J. C. Tu, J. M. Cioffi, IEEE Journal on Selected Areas in Communications	
Performance Evaluation of a Multichannel Transceiver System for ADSL and VHDSL Services	1991	P. S. Chow, J. C. Tu, J. M. Cioffi, IEEE Journal on Selected Areas in Communications	
History of Communications: Lighting Up Copper	2011	J. M. Cioffi, Communications Magazine	
Computers and Communications Integration Design, Analysis, Management	1986	Proceedings: IEEE Infocom '86, Fifth Annual Conference	

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
OFDM for Data Communication Over Mobile Radio FM Channels – Part 1: Analysis and Experimental Results	1991	E. F. Casas and C. Leung, IEEE Transactions on Communications	
Applied Digital Signal Processing: The Telebit Trailblazer Modem,	1988	M. Ballard, Packet Status Register	

Specific combinations that render the asserted claims of the DDE – Family 1 Patent obvious under 35 U.S.C. § 103 using these references are set forth in Exhibits G-01 through G-22. CommScope reserves the right to rely on the references listed above for motivation to combine, the state of the art and/or the background knowledge of one of ordinary skill in the art.

In addition, any of the foregoing anticipatory or secondary prior art references listed above may be combined with any of the prior art of record in the prosecution history of the DDE – Family 1 Patent (and all related patents and applications), or with any prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups' publications, reports or specifications), to render the asserted claims of the DDE – Family 1 Patent obvious. Further, any of the foregoing anticipatory or secondary prior art listed above may be combined with one another to render the asserted claims of the DDE – Family 1 Patent obvious.

Moreover, one of ordinary skill in the art would have been motivated to combine one or more of the prior art references identified above to arrive at the combination of elements recited in each of the asserted claims of the DDE – Family 1 Patent. The suggestion or motivation to modify or combine references for obviousness purposes is provided by the explicit and implicit

teachings of the prior art identified by CommScope, the knowledge of one of ordinary skill in the art, and/or the nature of the claimed invention and the problem(s) purportedly being solved.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts. The Supreme Court identified in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007), a number of rationales that would support a finding that the asserted claims are obvious:

- A. the Asserted Claims combine prior art elements according to known methods to yield predictable results;
- B. the Asserted Claims involve the simple substitution of one known element for another to obtain predictable results;
- C. the Asserted Claims involve the use of a known technique to improve similar devices (methods, or products) in the same way;
- D. the Asserted Claims apply a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- E. the Asserted Claims involve combinations of prior art references that would have been “obvious to try”—i.e., a person of ordinary skill in the art could have reached the Asserted Claims by choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- F. the Asserted Claims are simply variations of work from one field of endeavor or a different one that would have been prompted based on design incentives or other market forces because the variations were predictable to one of ordinary skill in the art.

KSR, 550 U.S. at 414–18 (rejecting Federal Circuit’s “rigid” application of motivation-to-combine test, and instead espousing “expansive and flexible” approach); *see also* Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg. 57,526 (Oct. 10, 2007). The Supreme Court has also held that a person of ordinary skill in the art is “a person of ordinary creativity, not an automaton,” that a motivation to combine may be simply “common sense,” and that “familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary

skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *KSR*, 550 U.S. at 420–21. The Supreme Court further held that it is sufficient that a combination of elements was “obvious to try,” holding that, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.” *Id.* at 421. Further, the Federal Circuit has held that a motivation to combine references may be implicit for patents based on improvements. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006). The prior art references identified herein are almost universally within the field of the asserted patents and are directed to similar subject matter within that field. Additionally, any products, devices, or processes described in the references existed and/or were invented before or during the period in which the claimed inventions were developed, providing further motivation to combine them. CommScope reserves the right to rely on forthcoming testimony in this litigation.

As an initial matter, CommScope notes that each prior art reference is in or relates to the same field, high-speed communications and DSL. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field or endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. The combination of prior art references identified in these contentions would have been obvious because the combinations represent the known potential options with a reasonable expectation of success. Additionally, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element

for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art generally. Also, market forces in the industry and the desire to improve features and performance would motivate the addition of features to systems as they become available; become smaller; become less expensive; become more commonly used; provide better performance; reduce costs; size or weight; or predictably achieve other clearly desirable results. For example, those in the DSL and high-speed telecommunications industry had long understood the need to avoid sending a technician to diagnose problems with a subscriber line. Those in the industry also understood the benefits of being able to obtain information about a subscriber line remotely, without the necessity of sending out a technician. The motivation to combine references is exemplary only, and should not be used to limit these disclosures. There would have been substantial motivation to combine the prior art references prior to the invention date, and CommScope reserves the right to and intends to supplement the foregoing with expert and other testimony. More detailed bases for the motivation to combine specific references will be set forth in CommScope's invalidity charts and expert report(s) on invalidity.

To the extent that TQ Delta raises any secondary considerations of non-obviousness, for example, in its expert reports, CommScope reserves the right to address any such considerations, including by taking discovery on those issues and supplementing and/or amending its invalidity contentions.

In addition, the asserted claims of the DDE – Family 1 Patent are invalid under the printed matter doctrine because certain limitations claim printed matter (i.e., content of information) that is not functionally or structurally related to the medium containing the printed matter. In the alternative, the asserted claims of the DDE – Family 1 Patent are invalid under the printed matter

doctrine because certain limitations claim printed matter and are not entitled to patentable weight, without which the claims are anticipated or rendered obvious by the cited references.

CommScope does not presently have any disclosures under 35 U.S.C. § 102(f). CommScope reserves the right to amend and supplement these § 102(f) contentions as further information and discovery are obtained including, in particular, with regard to the alleged conception and reduction-to-practice of the patents-in-suit.

B. INVALIDITY UNDER 35 U.S.C. § 112

CommScope lists below exemplary grounds upon which it contends the asserted claims of the DDE – Family 1 Patent are invalid for failure to meet one or more requirements of 35 U.S.C. § 112. A more detailed basis for CommScope’s written description, enablement, and indefiniteness defenses will be set forth in CommScope’s expert report(s) on invalidity. CommScope reserves the right to supplement and/or amend these contentions based on § 112 in light of discovery on invalidity issues and on any other basis permitted by the Court or the applicable rules. Such supplementation and/or amendments may include, but are not limited to, invalidity contentions based on indefiniteness, lack of written description, and/or lack of enablement.

1. Invalidity Under 35 U.S.C. § 112 ¶ 1

35 U.S.C. § 112 ¶ 1 requires that the specification contain a written description of the invention. “[T]he hallmark of written description is disclosure.” *Boston Scientific Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361–62 (Fed. Cir. 2011) (citation omitted). The test for whether a specification adequately describes an invention is “whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. . . . [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill

in the art. . . . [It] is a question of fact.” *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Boston Scientific*, 647 F.3d at 1362.

The enablement requirement of § 112 demands that the patent specification enable “those skilled in the art to make and use the full scope of the claimed invention without ‘undue experimentation.’” *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). “[T]he scope of the claims must be less than or equal to the scope of the enablement.” *Nat’l Recovery Tech., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999).

The asserted claims of the DDE – Family 1 Patent are invalid because the patent specification does not include sufficient description of the subject matter claimed, and the manner and process of using it, in such full, clear, concise, and exact terms as to enable any person of ordinary skill in the art to which it pertains to make and use the allegedly claimed invention without undue experimentation. CommScope further contends that the full scope of each asserted claim was not described with particularity in the specification to which priority is apparently sought, thereby setting forth insufficient detail to allow one of ordinary skill in the art to understand what is claimed and to recognize that the inventor(s) invented what is claimed. By way of example, and without limitation, at least the following elements are not enabled and/or fail to meet the written description requirement of § 112:

- “wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel and each bit in the diagnostic message is mapped to at least one DMT signal” (’686 Patent, claims 17, 40)
- “instructions that when executed transmit from the transceiver a diagnostic

message using multicarrier modulation with DMT symbols that are mapped to one bit of the diagnostic message, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel” (’686 Patent, claim 36)

- “wherein one variable comprises an array representing frequency domain received idle channel noise information” (’686 Patent, claims 17, 36, 40)

The asserted claims of the DDE – Family 1 Patent (and all other claims in the asserted patents that include or depend from any claims that include any of the above limitations) are invalid because they fail to meet the enablement and/or written description requirements of § 112.

The accused products do not infringe the asserted claims of the DDE – Family 1 Patent based on a proper interpretation of the scope of those claims. To the extent the asserted claims of the DDE – Family 1 Patent may eventually be construed so broadly as to cover the accused products, such a construction would render the asserted claims of the DDE – Family 1 Patent invalid for failure to meet the requirements of § 112 ¶ 1.

2. Invalidity Under 35 U.S.C. § 112 ¶ 2

Claims are indefinite under 35 U.S.C. § 112 ¶ 2 when they “fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). To the extent an asserted apparatus claim includes both apparatus and method limitations, that claim is invalid for indefiniteness under § 112 ¶ 2 because it fails to identify or notify the public of what constitutes direct infringement. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1383–84 (Fed. Cir. 2005).

The asserted claims of the DDE – Family 1 Patent are also invalid because they fail to particularly point out and distinctly claim the subject matter that the purported inventors claimed (i.e., the claims are indefinite). CommScope contends that a person of ordinary skill in the art to

which the purported invention pertains would not understand the scope of each asserted claim when read in light of the specification. By way of example, and without limitation, at least the following claim terms are indefinite under § 112:

- “wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel and each bit in the diagnostic message is mapped to at least one DMT signal” (’686 Patent, claims 17, 40)
- “instructions that when executed transmit from the transceiver a diagnostic message using multicarrier modulation with DMT symbols that are mapped to one bit of the diagnostic message, wherein the diagnostic message comprises a plurality of data variables representing the diagnostic information about the communication channel” (’686 Patent, claim 36)
- “wherein one variable comprises an array representing frequency domain received idle channel noise information” (’686 Patent, claims 17, 36, 40)

The asserted claims of the DDE – Family 1 Patent (and all other claims in the asserted patent that include or depend from any claims that include any of the above limitations) are invalid because they fail to particularly point out and distinctly claim the subject matter that the applicants regarded as their invention.

Further, the asserted claims of the DDE – Family 1 Patent are invalid under § 112 because they purport to claim both an apparatus and a method of using the apparatus. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377 (Fed. Cir. 2005). To the extent that the asserted claims of DDE – Family 1 invoke 35 U.S.C. § 112, ¶ 6 (pre-AIA), the asserted claims of DDE – Family 1 are invalid for failing to recite sufficient structure to perform the recited function. *See*

Williamson v. Citrix Online, LLC, 792 F.3d 1339 (Fed. Cir. Jun. 16, 2015) (en banc). For example, the specification of the DDE – Family 1 Patent does not recite sufficient structure for the “message determination module” recited in claim 5 of the ’686 Patent to perform its claimed function. Moreover, to the extent that the claimed functions are accomplished merely using software, no specific algorithm is disclosed to perform the claimed function. And to the extent that the asserted claims of the DDE – Family 1 Patent do not invoke 35 U.S.C. § 112, ¶ 6 (pre-AIA), those claims are invalid for merely claiming the function of an apparatus.

VI. INVALIDITY CONTENTIONS FOR DDE – PATENT FAMILY 2

A. INVALIDITY UNDER 35 U.S.C. § 102 AND/OR 35 U.S.C. § 103

In accordance with P. R. 3-3(b) and (c), claims 17-18 of the ’881 Patent (the “DDE – Family 2 Patent”) are anticipated and/or rendered obvious by at least the following references:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,222,858	U.S.	4/24/2001	Counterman
WO 1999/039468	W.I.P.O	8/5/1999	Edvardsen
6,178,448	U.S.	1/23/2001	Gray
7,068,657	U.S.	6/27/2006	Keller-Tuberg

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Inverse Multiplexing over ATM (IMA) Specification Version 1.0	July 1997	ATM Forum Technical Committee	IMA Spec 1.0

Products			
Title	Date of Relevant Publications	Corporation	Short Cite
Virtuoso chipset	4/22/1996, 8/3/1999 12/1/1999, 11/1/1999, 8/13/2002,	Amati Communications Corporation/Texas Instruments	Virtuoso

The patents, publications, and references identified above qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g). The charts identified as Exhibits H-01 through H-06 demonstrate how the asserted claims of the DDE – Family 2 Patent are anticipated and/or rendered obvious by the references above. Each chart identifies certain prior art to the DDE – Family 2 Patent and identifies at least one citation in the prior art reference where each claim element of the asserted claims is disclosed. Though the charts provide illustrative citations to where each claim element may be found in the prior art, the cited references may contain additional disclosures of each claim element as well, and CommScope reserves the right to assert that any claim element is disclosed in other portions of the cited references. In addition, CommScope identifies, and incorporates here by reference, all prior art of record in the prosecution history of the DDE – Family 2 Patent (and all related patents and applications), and all prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups' publications, reports, or specifications), any of which may anticipate and/or render the asserted claims of the DDE – Family 2 Patent obvious. Further, CommScope identifies any TQ Delta patents that claim the same priority date as any of the DDE – Family 2 Patent and disclose the same subject matter and for which a terminal disclaimer was not filed during prosecution, under the doctrine of obviousness-type double patenting. Additional evidence regarding the features and elements of prior art references may be provided by witness testimony, or by additional

documents and materials describing the prior art, that may be identified through the course of ongoing discovery and investigation.

To the extent that a reference above is found to be missing a limitation of the asserted claims of the DDE – Family 2 Patent, any one of the prior art references identified above may be combined with any one or more of the following references, all of which qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g), to render the asserted claims of the DDE – Family 2 Patent obvious under 35 U.S.C. § 103:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,956,872	U.S.	10/18/2005	Djokovic
6,002,670	U.S.	12/14/1999	Rahman
6,772,388	U.S.	8/3/2004	Cooper
5,617,417	U.S.	4/1/1997	Sathe
6,822,960	U.S.	11/23/2004	Manchester
5,617,417	U.S.	4/1/1997	Sathe
5,608,733	U.S.	3/4/1997	Valee 733
6,680,954	U.S.	1/20/2004	Cam
6,205,142	U.S.	3/20/2001	Vallee 142
5,727,051	U.S.	3/10/1998	Holender
6,178,448	U.S.	1/23/2001	Gray
6,408,005	U.S.	6/18/2002	Fan
6,941,252	U.S.	9/6/2005	Nelson
6,775,268	U.S.	8/10/2004	Wang 268

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,396,837	U.S.	5/28/2002	Wang 837
6,747,964	U.S.	6/8/2004	Bender
6,002,670	U.S.	12/14/1999	Rahman
7,343,543	U.S.	3/11/2008	Mantha
6,775,320	U.S.	8/10/2004	Tzannes 320
6,772,388	U.S.	8/3/2004	Cooper
6,956,872	U.S.	10/18/2005	Djokovic
EP 1009154 (A2)	E.U.	6/14/2000	Aravamudan

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
ATM Transport over ADSL Recommendation	August 2001	Broadband Forum	TR-042
Asymmetric digital subscriber line transceivers	6/22/1999	International Telecommunications Union	G.992.1

Specific combinations that render the asserted claims of the DDE – Family 2 Patent obvious under 35 U.S.C. § 103 using these references are set forth in Exhibits H-01 through H-06. CommScope reserves the right to rely on the references listed above for motivation to combine, the state of the art and/or the background knowledge of one of ordinary skill in the art.

In addition, any of the foregoing anticipatory or secondary prior art references listed above may be combined with any of the prior art of record in the prosecution history of the DDE – Family

2 Patent (and all related patents and applications), or with any prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups' publications, reports or specifications), to render the asserted claims of the DDE – Family 2 Patent obvious. Further, any of the foregoing anticipatory or secondary prior art listed above may be combined with one another to render the asserted claims of the DDE – Family 2 Patent obvious.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts. The Supreme Court identified in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007), a number of rationales that would support a finding that the asserted claims are obvious:

- A. the Asserted Claims combine prior art elements according to known methods to yield predictable results;
- B. the Asserted Claims involve the simple substitution of one known element for another to obtain predictable results;
- C. the Asserted Claims involve the use of a known technique to improve similar devices (methods, or products) in the same way;
- D. the Asserted Claims apply a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- E. the Asserted Claims involve combinations of prior art references that would have been “obvious to try”—i.e., a person of ordinary skill in the art could have reached the Asserted Claims by choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- F. the Asserted Claims are simply variations of work from one field of endeavor or a different one that would have been prompted based on design incentives or other market forces because the variations were predictable to one of ordinary skill in the art.

KSR, 550 U.S. at 414–18 (rejecting Federal Circuit’s “rigid” application of motivation-to-combine test, and instead espousing “expansive and flexible” approach); *see also* Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg. 57,526 (Oct. 10, 2007). The Supreme Court

has also held that a person of ordinary skill in the art is “a person of ordinary creativity, not an automaton,” that a motivation to combine may be simply “common sense,” and that “familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *KSR*, 550 U.S. at 420–21. The Supreme Court further held that it is sufficient that a combination of elements was “obvious to try,” holding that, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.” *Id.* at 421. Further, the Federal Circuit has held that a motivation to combine references may be implicit for patents based on improvements. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006). The prior art references identified herein are almost universally within the field of the asserted patents and are directed to similar subject matter within that field. Additionally, any products, devices, or processes described in the references existed and/or were invented before or during the period in which the claimed inventions were developed, providing further motivation to combine them. CommScope reserves the right to rely on forthcoming testimony in this litigation.

One of ordinary skill in the art would have been motivated to combine one or more of the prior art references identified above to arrive at the combination of elements recited in each of the asserted claims of the DDE – Family 2 Patent. The suggestion or motivation to modify or combine references for obviousness purposes is provided by the explicit and implicit teachings of the prior art identified by CommScope, the knowledge of one of ordinary skill in the art, and/or the nature of the claimed invention and the problem(s) purportedly being solved. As an initial matter, CommScope notes that each prior art reference is in or relates to the same field, high-speed

communications, and more specifically, ATM and DSL networks. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field or endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. The combination of prior art references identified in these contentions would have been obvious because the combinations represent the known potential options with a reasonable expectation of success. Additionally, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art generally. Also, market forces in the industry and the desire to improve features and performance would motivate the addition of features to systems as they become available; become smaller; become less expensive; become more commonly used; provide better performance; reduce costs; size or weight; or predictably achieve other clearly desirable results. For example, one common, known method of handling a difference in delay was to provide an additional buffer or memory of appropriate size. Those in the DSL and high-speed communications industry understood that larger memory increased costs and complexity of a transceiver or modem, and that a smaller, cheaper, less complex device was desirable. Moreover, those of ordinary skill in the art at the time of the alleged invention understood that increased differential delay in multiplexed (or “bonded”) communications systems had the effect of slowing down overall data rates. Those of ordinary skill in the art also understood that providing higher overall data rates was desirable and could provide an advantage in the marketplace. The motivation to combine references is exemplary only, and should not be used to limit these disclosures. There would have been substantial motivation to

combine the prior art references prior to the invention date, and CommScope reserves the right to and intends to supplement the foregoing with expert and other testimony. More detailed bases for the motivation to combine specific references will be set forth in CommScope's expert report(s) on invalidity following claim construction and discovery on validity issues.

To the extent that TQ Delta raises any secondary considerations of non-obviousness, for example, in its expert reports, CommScope reserves the right to address any such considerations.

CommScope does not presently have any disclosures under 35 U.S.C. § 102(f). CommScope reserves the right to amend and supplement these § 102(f) contentions as further information and discovery are obtained including, in particular, with regard to the alleged conception and reduction-to-practice of the patents-in-suit.

B. INVALIDITY UNDER 35 U.S.C. § 112

CommScope lists below exemplary grounds upon which it contends the asserted claims of the DDE – Family 2 Patent are invalid for failure to meet one or more requirements of 35 U.S.C. § 112. A more detailed basis for CommScope's written description, enablement, and indefiniteness defenses will be set forth in CommScope's expert report(s) on invalidity. CommScope reserves the right to supplement and/or amend these contentions based on § 112 in light of discovery on invalidity issues and on any other basis permitted by the Court or the applicable rules. Such supplementation and/or amendments may include, but are not limited to, invalidity contentions based on indefiniteness, lack of written description, and/or lack of enablement.

1. Invalidity Under 35 U.S.C. § 112 ¶ 1

35 U.S.C. § 112 ¶ 1 requires that the specification contain a written description of the invention. "[T]he hallmark of written description is disclosure." *Boston Scientific Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361–62 (Fed. Cir. 2011) (citation omitted). The test for

whether a specification adequately describes an invention is “whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. . . . [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. . . . [It] is a question of fact.” *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Boston Scientific*, 647 F.3d at 1362.

The enablement requirement of § 112 demands that the patent specification enable “those skilled in the art to make and use the full scope of the claimed invention without ‘undue experimentation.’” *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). “[T]he scope of the claims must be less than or equal to the scope of the enablement.” *Nat’l Recovery Tech., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999).

The asserted claims of the DDE – Family 2 Patent are invalid because the patent specification does not include sufficient description of the subject matter claimed, and the manner and process of using it, in such full, clear, concise, and exact terms as to enable any person of ordinary skill in the art to which it pertains to make and use the claimed subject matter without undue experimentation. CommScope further contends that the full scope of each asserted claim was not described with particularity in the specification to which priority is apparently sought, thereby setting forth insufficient detail to allow one of ordinary skill in the art to understand what is claimed and to recognize that the inventor(s) invented what is claimed. By way of example, and without limitation, at least the following elements are not enabled and/or fail to meet the written description requirement of § 112:

- “utilizing at least one transmission parameter value to reduce a difference in

latency” (’881 Patent, claim 17)

- “selecting at least one transmission parameter value to reduce a difference in latency between the bonded transceivers” (’881 Patent, claim 25)
- “utilize at least one transmission parameter value, for each transceiver in a plurality of bonded transceivers, to reduce a difference in latency between the bonded transceivers” (’881 Patent, claim 33)
- “select at least one transmission parameter value, for each transceiver in a plurality of bonded transceivers, to reduce a difference in latency between the bonded transceivers” (’881 patent, claim 37)
- “bonded transceivers” (’881 Patent, claims 17, 25)
- “A plurality of bonded transceivers, each bonded transceiver utilizing at least one transmission parameter value to reduce a difference in latency between the bonded transceivers” (’881 Patent, claim 17)
- “A plurality of bonded transceivers, each bonded transceiver selecting at least one transmission parameter value to reduce a difference in latency between the bonded transceivers” (’881 Patent, claim 25)

The asserted claims of the DDE – Family 2 Patent (and all other claims in the asserted patents that include or depend from any claims that include any of the above limitations) are invalid because they fail to meet the enablement and/or written description requirements of § 112.

The accused products do not infringe the asserted claims of the DDE – Family 2 Patent based on a proper interpretation of the scope of those claims. To the extent the asserted claims of the DDE – Family 2 Patent may eventually be construed so broadly as to cover the accused

products, such a construction would render the asserted claims of the DDE – Family 2 Patent invalid for failure to meet the requirements of § 112 ¶ 1.

2. Invalidity Under 35 U.S.C. § 112 ¶ 2

Claims are indefinite under 35 U.S.C. § 112 ¶ 2 when they “fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). To the extent an asserted apparatus claim includes both apparatus and method limitations, that claim is invalid for indefiniteness under § 112 ¶ 2 because it fails to identify or notify the public of what constitutes direct infringement. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1383–84 (Fed. Cir. 2005).

The asserted claims of the DDE – Family 2 Patent are also invalid because they fail to particularly point out and distinctly claim the subject matter that the purported inventors claimed (i.e., the claims are indefinite). A person of ordinary skill in the art to which the purported invention pertains would not understand the scope of each asserted claim when read in light of the specification. By way of example, and without limitation, at least the following claim terms are indefinite under § 112:

- “utilizing at least one transmission parameter value to reduce a difference in latency” (’881 Patent, claim 17)
- “selecting at least one transmission parameter value to reduce a difference in latency between the bonded transceivers” (’881 Patent, claim 25)
- “utilize at least one transmission parameter value, for each transceiver in a plurality of bonded transceivers, to reduce a difference in latency between the bonded transceivers” (’881 Patent, claim 33)
- “select at least one transmission parameter value, for each transceiver in a

plurality of bonded transceivers, to reduce a difference in latency between the bonded transceivers” (’881 patent, claim 37)

- “bonded transceivers” (’881 Patent, claims 17, 25)
- “A plurality of bonded transceivers, each bonded transceiver utilizing at least one transmission parameter value to reduce a difference in latency between the bonded transceivers” (’881 Patent, claim 17)
- “A plurality of bonded transceivers, each bonded transceiver selecting at least one transmission parameter value to reduce a difference in latency between the bonded transceivers” (’881 Patent, claim 25)
- “reduce a difference in latency” (’881 Patent, claims 17, 25, 33, 37)

The asserted claims of the DDE – Family 2 Patent (and all other claims in the asserted patent that include or depend from any claims that include any of the above limitations) are invalid because they fail to particularly point out and distinctly claim the subject matter that the applicants regarded as their invention.

Further, the asserted claims of the DDE – Family 2 Patent are invalid under § 112 because they purport to claim both an apparatus and a method of using the apparatus. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377 (Fed. Cir. 2005). To the extent that the asserted claims of the DDE – Family 2 Patent do not invoke 35 U.S.C. § 112, ¶ 6 (pre-AIA), those claims are invalid for merely claiming the function of an apparatus. Thus, each asserted claim is invalid as indefinite under § 112 ¶ 2.

VII. INVALIDITY CONTENTIONS FOR DDE – PATENT FAMILY 3**A. INVALIDITY UNDER 35 U.S.C. § 102 AND/OR 35 U.S.C. § 103**

In accordance with P. R. 3-3(b) and (c), the asserted claims of the '048 Patent and the '882 Patent (the “DDE – Family 3 Patents”) are anticipated and/or rendered obvious by at least the following references:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
2005/0034046	U.S.	2/10/2005	Berkmann
5,912,898	U.S.	6/15/1999	Khoury
6,707,822	U.S.	3/16/2004	Fadavi-Ardekani
5,063,533	U.S.	11/5/1999	Erhart
7,269,029	U.S.	1/24/2002	Mazzoni
6,484,283	U.S.	11/19/2002	Stephen
7,200,169	U.S.	04/03/2007	Suzuki
7,269,208	U.S.	1/24/2002	Mazzoni
6,775,320	U.S.	8/10/2004	Tzannes 320
6,381,728	U.S.	4/30/2002	Kang
5,751,741	U.S.	5/12/1998	Voith

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
VDSL2 - Constraining the Interleaver Complexity	June 2004	International Telecommunications Union –	LB-031

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
		Telecommunication Standardization Sector	
G.vdsl: Adaptive impulse noise protection	June 2004	International Telecommunications Union – Telecommunication Standardization Sector	LB-033
Very High Speed Digital Subscriber Line Transceivers	6/13/2004	International Telecommunications Union	G.993.1
Splitterless asymmetric digital subscriber line (ADSL) transceivers	7/1/1999	International Telecommunications Union	G.992.2
Asymmetric digital subscriber line transceivers	6/22/1999	International Telecommunications Union	G.992.1

Products			
Title	Date of Relevant Publications	Corporation	Short Cite
Amati Communications Corporation synchronized discrete multitone products	4/22/1996, 8/3/1999, 12/1/1999, 11/1/1999, 8/13/2002,	Amati Communications Corporation/Texas Instruments	SDMT Products

Specific combinations that render the asserted claims of the DDE – Family 3 Patents obvious under 35 U.S.C. § 103 using these references are set forth in Exhibits I-01 through I-12 and J-01 through J-11. CommScope reserves the right to rely on the references listed above for

motivation to combine, the state of the art and/or the background knowledge of one of ordinary skill in the art.

The patents, publications, and references identified above qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g). The charts identified as Exhibits I-01 through I-12 and J-01 through J-11 demonstrate how the asserted claims of the DDE – Family 3 Patents are anticipated and/or rendered obvious by the references above. Each chart identifies certain prior art to the DDE – Family 3 Patents and identifies at least one citation in the prior art reference where each claim element of the asserted claims is disclosed. Though the charts provide illustrative citations to where each claim element may be found in the prior art, the cited references may contain additional disclosures of each claim element as well, and CommScope reserves the right to assert that any claim element is disclosed in other portions of the cited references. In addition, CommScope identifies, and incorporates here by reference, all prior art of record in the prosecution history of the DDE – Family 3 Patents (and all related patents and applications), and all prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups' publications, reports, or specifications), any of which may anticipate and/or render the asserted claims of the DDE – Family 3 Patents obvious.

To the extent that a reference above is found to be missing a limitation of the asserted claims of the DDE – Family 3 Patents, any one of the prior art references identified above may be combined with any one or more of the following references, all of which qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g), to render the asserted claims of the DDE – Family 3 Patents obvious under 35 U.S.C. § 103:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
2003/0179770	U.S.	9/25/2003	Reznice
2005/0034046	U.S.	2/10/2005	Berkmann
2005/0254441	U.S.	11/17/2005	Levi
2003/0088821	U.S.	5/8/2003	Yokokawa
2003/0093750	U.S.	5/15/2003	Cameron
2001/0039637	U.S.	11/8/2001	Bengough
5,063,533	U.S.	11/5/1991	Erhart
5,563,915	U.S.	10/8/1996	Stewart
5,751,741	U.S.	5/12/1998	Voith
5,757,416	U.S.	5/26/1998	Birch
5,867,400	U.S.	2/2/1999	El-Ghoroury
5,912,898	U.S.	6/15/1999	Khoury
5,968,200	U.S.	10/19/1999	Amrany
5,991,857	U.S.	11/23/1999	Koetje
6,151,690	U.S.	11/21/2000	Peeters
6,392,572	U.S.	5/21/2002	Shiu
6,480,976	U.S.	11/12/2002	Pan
6,484,283	U.S.	11/19/2002	Stephen
6,553,534	U.S.	4/22/2003	Yonge
6,704,848	U.S.	3/9/2004	Song
6,922,444	U.S.	7/26/2005	Cai
6,988,234	U.S.	1/17/2006	Han

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
7,187,708	U.S.	3/6/2007	Shiu
7,200,169	U.S.	4/3/2007	Suzuki
7,266,132	U.S.	9/4/2007	Liu
7,269,208	U.S.	9/11/2007	Mazzoni
KR 100295086B1	Korea	7/12/2001	

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
80-Mb/s QPSK and 72-Mb/s 64-QAM Flexible and Scalable Digital OFDM Transceiver ASICs for Wireless Local Area Networks in the 5-GHz Band	November 2001	Eberle, IEEE Journal Of Solid-State Circuits	
VDSL2 - Constraining the Interleaver Complexity	June 2004	International Telecommunications Union – Telecommunication Standardization Sector	LB-031

In addition, any of the foregoing anticipatory or secondary prior art references listed above may be combined with any of the prior art of record in the prosecution history of the DDE – Family 3 Patents (and all related patents and applications), or with any prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups' publications, reports or specifications), to render the asserted claims of the DDE – Family 3 Patents

obvious. Further, any of the foregoing anticipatory or secondary prior art listed above may be combined with one another to render the asserted claims of the DDE – Family 3 Patents obvious.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts. The Supreme Court identified in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007), a number of rationales that would support a finding that the asserted claims are obvious:

- A. the Asserted Claims combine prior art elements according to known methods to yield predictable results;
- B. the Asserted Claims involve the simple substitution of one known element for another to obtain predictable results;
- C. the Asserted Claims involve the use of a known technique to improve similar devices (methods, or products) in the same way;
- D. the Asserted Claims apply a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- E. the Asserted Claims involve combinations of prior art references that would have been “obvious to try”—i.e., a person of ordinary skill in the art could have reached the Asserted Claims by choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- F. the Asserted Claims are simply variations of work from one field of endeavor or a different one that would have been prompted based on design incentives or other market forces because the variations were predictable to one of ordinary skill in the art.

KSR, 550 U.S. at 414–18 (rejecting Federal Circuit’s “rigid” application of motivation-to-combine test, and instead espousing “expansive and flexible” approach); *see also* Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg. 57,526 (Oct. 10, 2007). The Supreme Court has also held that a person of ordinary skill in the art is “a person of ordinary creativity, not an automaton,” that a motivation to combine may be simply “common sense,” and that “familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary

skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *KSR*, 550 U.S. at 420–21. The Supreme Court further held that it is sufficient that a combination of elements was “obvious to try,” holding that, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.” *Id.* at 421. Further, the Federal Circuit has held that a motivation to combine references may be implicit for patents based on improvements. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006). The prior art references identified herein are almost universally within the field of the asserted patents and are directed to similar subject matter within that field. Additionally, any products, devices, or processes described in the references existed and/or were invented before or during the period in which the claimed inventions were developed, providing further motivation to combine them. CommScope reserves the right to rely on forthcoming testimony in this litigation.

One of ordinary skill in the art would have been motivated to combine one or more of the prior art references identified above to arrive at the combination of elements recited in each of the asserted claims of the DDE – Family 3 Patents. The suggestion or motivation to modify or combine references for obviousness purposes is provided by the explicit and implicit teachings of the prior art identified by CommScope, the knowledge of one of ordinary skill in the art, and/or the nature of the claimed invention and the problem(s) purportedly being solved.

As an initial matter, CommScope notes that each prior art reference is in or relates to the same field, high-speed communications and DSL systems. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field or endeavor prompted variations

based on predictable design incentives and/or market forces either in the same field or a different one. The combinations of prior art references identified in these contentions would have been obvious because the combinations represent the known potential options with a reasonable expectation of success.

Additionally, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art generally. Also, market forces in the industry and the desire to improve features and performance would motivate the addition of features to systems as they become available; become smaller; become less expensive; become more commonly used; provide better performance; reduce costs; size or weight; or predictably achieve other clearly desirable results.

Those in the industry had long recognized that memory in a DSL (or other telecommunications) transceiver was a significant source of expense, complexity, and inefficiency. The benefits of sharing memory between multiple processes or latency paths (for example, an interleaver and a deinterleaver) to reduce the amount of memory required in a system (and in turn, the cost) had also been recognized by those of ordinary skill in the art. *See, e.g.*, Fadavi-Ardekani, col. 5:57–6:6; 6:55–65; 7:25–30; 8:58–9:3, G.993.1 § 8.4.1 (describing implementation of interleaver memory, and noting that “[t]he same size interleaving memory (see Table 8-1) is needed for interleaving at the transmitter and de-interleaving at the receiver.”); G.992.2, §§ 7.6; 11.1.1. Those of ordinary skill in the art had also recognized that allocating the ability to change the allocation of interleaver and deinterleaver memory would likewise be advantageous to further reduce the amount of memory required. *See, e.g.*, LB-031 at p. 1 (“The interleaver is a major

source of complexity in VDSL2. We propose that the interleaver delay in time be restricted rather than restricting the depth as in ADSL2. This allows . . . lower complexity implementations for profiles that do not require the full VDSL2 data rate.”); Mazzoni at col. 1:39–43 (“The processes of interleaving and deinterleaving data sent and received by a modem necessitates the use of memories. For a modem intended to operate at a predetermined bit rate, the memories must have a capacity that depends on that bit rate.”); *id.* at col. 1:47–49 (“An object of the invention is to provide a send/receive device (i.e., modem) architecture which requires a reduced quantity of memory.”).

The motivation to combine references is exemplary only, and should not be used to limit these disclosures. There would have been substantial motivation to combine the prior art references prior to the invention date, and CommScope reserves the right to and intends to supplement the foregoing with expert and other testimony. More detailed bases for the motivation to combine specific references will be set forth in CommScope’s invalidity charts, and CommScope’s expert report(s) on invalidity.

There are no secondary considerations of non-obviousness pertinent to the obviousness of the subject matter of the asserted claims. To the extent that TQ Delta raises any secondary considerations of non-obviousness, for example, in its expert reports, CommScope reserves the right to address any such considerations, including by taking discovery on those issues and supplementing and/or amending its invalidity contentions, as well as through CommScope’s expert report(s).

In addition, the asserted claims of the DDE – Family 3 Patents are invalid under the printed matter doctrine because certain limitations claim printed matter (i.e., content of information) that is not functionally or structurally related to the medium containing the printed matter. In the

alternative, the asserted claims of the DDE – Family 3 Patents are invalid under the printed matter doctrine because certain limitations claim printed matter and are not entitled to patentable weight, without which the claims are anticipated or rendered obvious by the cited references. By way of example and not of limitation, printed matter includes limitations directed to the contents of messages or data variables, such as a “message . . . specifying a maximum number of bytes of memory that are available to be allocated to an interleaver” or that data bytes are “Reed Solomon (RS) coded data bytes.”

Moreover, the asserted claims of the DDE – Family 3 Patents are invalid to the extent that the named inventors did not themselves invent the subject matter sought to be patented. *See* 35 U.S.C. § 102(f). For example, in *TQ Delta, LLC v. 2Wire, Inc.*, No. 1:13-cv-01835-RGA (D. Del. filed November 4, 2013) named inventor Michael Lund testified that he did not recall to what extent he worked on the claimed subject matter of the DDE – Family 3 Patents, and that he did not recall being involved in prosecution of the claimed subject matter of the DDE – Family 3 patents. *See* Transcript of Deposition of Michael A. Lund, Nov. 30, 2017 at *e.g.*, 67:8–74:7, 75:20–76:8, 79:21–80:13.

CommScope reserves the right to amend and supplement these § 102(f) contentions as further information and discovery are obtained including, in particular, with regard to the alleged conception and reduction-to-practice of the patents-in-suit.

B. INVALIDITY UNDER 35 U.S.C. § 112

CommScope lists below exemplary grounds upon which the asserted claims of the DDE – Family 3 Patents are invalid for failure to meet one or more requirements of 35 U.S.C. § 112. A more detailed basis for CommScope’s written description, enablement, and indefiniteness defenses will be set forth in CommScope’s expert report(s) on invalidity. Furthermore, discovery regarding invalidity (*e.g.*, inventor depositions, etc.) is ongoing. CommScope reserves the right to

supplement and/or amend these contentions based on § 112 in light of discovery on invalidity issues. Such supplementation and/or amendments may include, but are not limited to, and/or invalidity contentions based on indefiniteness, lack of written description, and/or lack of enablement should the claims be construed under 35 U.S.C. § 112 ¶ 6.

1. Invalidity Under 35 U.S.C. § 112 ¶ 1

35 U.S.C. § 112 ¶ 1 requires that the specification contain a written description of the invention. “[T]he hallmark of written description is disclosure.” *Boston Scientific Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361–62 (Fed. Cir. 2011) (citation omitted). The test for whether a specification adequately describes an invention is “whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. . . . [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. . . . [It] is a question of fact.” *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Boston Scientific*, 647 F.3d at 1362.

The enablement requirement of § 112 demands that the patent specification enable “those skilled in the art to make and use the full scope of the claimed invention without ‘undue experimentation.’” *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). “[T]he scope of the claims must be less than or equal to the scope of the enablement.” *Nat’l Recovery Tech., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999).

The asserted claims of the DDE – Family 3 Patents are invalid because the patent specification does not include sufficient description of the claimed subject matter, and the manner and process of using it, in such full, clear, concise, and exact terms as to enable any person of ordinary skill in the art to which it pertains to make and use the claimed subject matter without

undue experimentation. CommScope further contends that the full scope of each of the asserted claims of the DDE – Family 3 Patents was not described with particularity in the specification to which priority is apparently sought, thereby setting forth insufficient detail to allow one of ordinary skill in the art to understand what is claimed and to recognize that the inventor(s) invented what is claimed. By way of example, and without limitation, at least the following elements are not enabled and/or fail to meet the written description requirement of § 112:

- “a maximum number of bytes of memory that are available to be allocated” (’048 Patent, claim 1; ’882 Patent, claims 9 and 13)
- “wherein the shared memory allocated to the [interleaver/deinterleaver] is used at the same time as the shared memory allocated to the [deinterleaver/interleaver]” (’048 Patent, claim 1; ’882 Patent, claims 9 and 13)

TQ Delta’s Asserted DDE – Family 3 Claims (and all other claims in the asserted patents that include or depend from any claims that include any of the above limitations) are invalid because they fail to meet the enablement and/or written description requirements of § 112.

The accused products do not infringe the asserted claims of the DDE – Family 3 Patents based on a proper interpretation of the scope of those claims. To the extent TQ Delta’s Asserted DDE – Family 3 Claims may eventually be construed so broadly as to cover the accused products, such a construction would render those claims invalid for failure to meet the requirements of § 112 ¶ 1.

2. Invalidity Under 35 U.S.C. § 112 ¶ 2

Claims are indefinite under 35 U.S.C. § 112 ¶ 2 when they “fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). To the extent an asserted apparatus claim includes

both apparatus and method limitations, that claim is invalid for indefiniteness under § 112 ¶ 2 because it fails to identify or notify the public of what constitutes direct infringement. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1383–84 (Fed. Cir. 2005).

TQ Delta's Asserted DDE – Family 3 Claims are also invalid because they fail to particularly point out and distinctly claim the subject matter that the purported inventors claimed. CommScope contends that a person of ordinary skill in the art to which the purported invention pertains would not understand the scope of each asserted claim when read in light of the specification. By way of example, and without limitation, at least the following claim terms are indefinite under § 112:

- “a maximum number of bytes of memory that are available to be allocated” ('048 Patent, claim 1; '882 Patent, claims 9 and 13)
- “wherein the shared memory allocated to the interleaver is used at the same time as the shared memory allocated to the deinterleaver” ('048 Patent, claim 1; '882 Patent, claims 9 and 13)

The asserted claims of the DDE – Family 3 Patents (and all other claims in the asserted patents that include or depend from any claims that include any of the above limitations) are invalid because they fail to particularly point out and distinctly claim the subject matter that the applicants regard as their invention.

Further, the asserted claims of the DDE – Family 3 Patents are invalid under § 112. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377 (Fed. Cir. 2005). “*IPXL* indefiniteness arises when a person of ordinary skill in the art would be unable to tell if the apparatus itself would infringe or if the apparatus would have to be used in a certain way to infringe.” *Sound View Innovations, LLC v. Facebook, Inc.*, No. 16-cv-116, 2017 WL 2221177, at *8 (D. Del. May 19,

2017) (discussing *IPXL* 430 F.3d at 1384). Although *IPXL* addressed a claim that recited both an apparatus and method steps, the Federal Circuit recognized that the reason such claims are indefinite under § 112 ¶ 2 is that they are “not sufficiently precise to provide competitors with an accurate determination of the ‘metes and bounds’ of protection involved,” making it unclear when infringement occurs. *IPXL*, 430 F.3d at 1384 (citation omitted). Thus, the focus of the inquiry is whether a person of ordinary skill in the art would know when infringement occurs, and whether the claim “does not apprise a person of ordinary skill in the art of its scope.” *Id.* Moreover, after *IPXL* issued, the Supreme Court confirmed the critical public notice function of § 112 ¶ 2. *See Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2130 (2014) (warning against “diminish[ing] the definiteness requirement’s public-notice function” and “foster[ing] the innovation-discouraging zone of uncertainty against which this Court has warned”) (citation and internal quotation marks omitted).

Claim 13 of the ’882 Patent is indefinite under *IPXL*. Claim 13 of the ’882 Patent is directed to a “system that allocates shared memory” comprising “a transceiver.” The claim then recites that the transceiver “performs” a list of method steps: “transmitting or receiving a message...,” “determining an amount of memory...,” “allocating a first number of bytes...,” “allocating a second number of bytes...,” and “deinterleaving the first plurality of RS coded data bytes... .” The use of the present participle (“ing”) within the claim indicates the presence of method steps. *Compare Sound View Innovations*, 2017 WL 2221177, at *9 (observing that claim language using “the present participle form of verbs” such as “receiving” and “repeating” is “suggestive of method claiming” and finding claim indefinite under *IPXL*). The system claim’s ordered references to transmitting or receiving a message, allocating a first number of bytes, and allocating a second number of bytes likewise bears the hallmarks of method claiming. *See id.* at

*10 (finding that recitation of a “first” message received and a “second” message received indicated “order,” as one aspect of method claiming). The first step of the claim recites an apparatus, which would normally indicate that merely buying, using, or selling the apparatus would infringe the claim. The later limitations introduce method steps, such as receiving messages and allocating memory. Viewed by themselves, these would be method steps that would have to be performed in order for the claim to be infringed. Viewed together, it is unclear whether a system with a transceiver itself infringes, or whether the transceiver must be used to perform each of the recited steps to infringe. Thus, this claim is indefinite. *Sound View Innovations*, 2017 WL 2221177, at *8; *IPXL*, 430 F.3d at 1384.

Claims 1 and 5 of the ’048 Patent and claim 9 of the ’882 Patent are also indefinite for at least the same reasons provided above for claim 13 of the ’882 Patent.

VIII. INVALIDITY CONTENTIONS FOR DDE – PATENT FAMILY 4

A. Invalidity Under 35 U.S.C. § 102 and/or 35 U.S.C. § 103

In accordance with P. R. 3-3(b) and (c), claim 14 of the ’008 Patent (the “DDE – Family 4 Patent”) is anticipated and/or rendered obvious by at least the following references:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,125,103	U.S.	9/26/2000	Bauml
6,556,557	U.S.	4/9/2003	Cimini
6,963,599	U.S.	11/8/2005	Dunn
6,781,951	U.S.	8/24/2004	Fifield
5,682,376	U.S.	10/28/1997	Hayashino
6,310,869	U.S.	10/30/2001	Holtzman

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,301,268	U.S.	10/9/2001	Laroia
EP 0743768	E.U.	11/20/1996	Narahashi
6,625,219	U.S.	9/23/2003	Stopler
6,088,406	U.S.	7/11/2000	Suzuki 406
5,903,614	U.S.	5/11/1999	Suzuki 614
6,657,949	U.S.	9/26/2000	Jones
5,694,415	U.S.	12/2/1997	Suzuki 415
EP 0895389 (A2)	E.U.	2/3/1999	Williams
6,590,860	U.S.	7/8/2003	Sakoda
4,924,516	U.S.	5/8/1990	Bremer
EP 0552034 (A2)	E.U.	7/21/1993	Kaku
6,625,219	U.S.	9/23/2003	Stopler
6,144,696	U.S.	11/7/2000	Shively
7,292,627	U.S.	11/6/2007	Tzannes 627
7,471,721	U.S.	12/30/2008	Tzannes 721
8,073,041	U.S.	12/6/2011	Tzannes 041
8,090,008	U.S.	1/3/2012	Tzannes 008
8,218,610	U.S.	7/10/2012	Tzannes 610
8,355,427	U.S.	1/15/2013	Tzannes 427
6,590,893	U.S.	7/8/2003	Hwang

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
TI.413 Issue 2: Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface	6/5/1998	American National Standards Institute	T1-413-1998
Multitone Signals with Low Crest Factor	Oct. 1986	S. Boyd, IEEE Transactions on Circuits and Systems	Boyd
PAR Reduction Without Noise Enhancement	9/22/1997	T1E1.4 Technical Subcommittee Working Group	Djokovic
Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface	August 1995	American National Standards Institute	T1.413-1995

The patents, publications, and references identified above qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g). The charts identified as Exhibits K-01 through K-19 demonstrate how the asserted claim of the DDE – Family 4 Patent is anticipated and/or rendered obvious by the references above. Each chart identifies certain prior art to the DDE – Family 4 Patent and identifies at least one citation in the prior art reference where each claim element of the asserted claim is disclosed. Though the charts provide illustrative citations to where each claim element may be found in the prior art, the cited references may contain additional disclosures of each claim element as well, and CommScope reserves the right to assert that any claim element is disclosed in other portions of the cited references. In addition, CommScope identifies, and incorporates herein by reference, all prior art of record in the prosecution history of

the DDE – Family 4 Patent (and all related patents and applications), the applicant’s admitted prior art, including admissions in U.S. Provisional Application 60/164,134, and all prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups’ publications, reports, or specifications), any of which may anticipate and/or render the asserted claim obvious. Further, CommScope identifies any TQ Delta patents that claim the same priority date as the DDE – Family 4 Patent and disclose the same subject matter and for which a terminal disclaimer was not filed during prosecution, under the doctrine of obviousness-type double patenting. This includes, but is not limited to, U.S. Patent No. 7,471,721 and U.S. Patent No. 8,218,610. Additional evidence regarding the features and elements of prior art references may be provided by witness testimony, or by additional documents and materials describing the prior art, that may be identified through the course of ongoing discovery and investigation.

To the extent that a reference above is found to be missing a limitation of the asserted claim, any one of the prior art references identified above may be combined with one another or with any one or more of the following references, all of which qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g), to render the asserted claim obvious under 35 U.S.C. § 103:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
5,694,415	U.S.	12/2/1997	Suzuki 415
6,590,860	U.S.	7/8/2003	Sakoda
6,310,869	U.S.	10/30/2001	Holtzman
5,682,376	U.S.	10/28/1997	Hayashino

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,963,599	U.S.	11/8/2005	Dunn
6,590,893	U.S.	7/8/2003	Hwang
6,625,219	U.S.	9/23/2003	Stopler
EP 0895389 (A2)	E.U.	2/3/1999	Williams
4,924,516	U.S.	5/8/1990	Bremer
6,657,949	U.S.	9/26/2000	Jones
6,301,268	U.S.	10/9/2001	Laroia
6,144,696	U.S.	11/7/2000	Shively
5,896,419	U.S.	4/20/1999	Suzuki 419
6,233,247	U.S.	5/15/2001	Alami
6,240,141	U.S.	5/29/2001	Long
6,757,299	U.S.	6/29/2004	Verma
6,507,585	U.S.	1/14/2003	Dobson
4,408,298	U.S.	10/4/1983	Ruhland
3,811,038	U.S.	5/14/1974	Reddaway
4,672,629	U.S.	6/9/1987	Beier
5,694,389	U.S.	12/2/1997	Seki
6,324,171	U.S.	11/27/2001	Lee
6,438,186	U.S.	8/20/2002	Strait
5,101,417	U.S.	12/19/2012	Richley
6,389,080	U.S.	5/14/2002	Barnes
6,081,502	U.S.	6/27/2000	Paneth

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,112,094	U.S.	8/29/2000	Dent
6,731,594	U.S.	5/4/2004	Bohnke
5,367,516	U.S.	11/22/1994	Miller
6,125,103	U.S.	9/26/2000	Bauml
6,556,557	U.S.	4/29/2003	Cimini
5,903,614	U.S.	5/11/1999	Suzuki 614
6,781,951	U.S.	8/24/2004	Fifield
EP 0552034 (A2)	E.U.	7/21/1993	Kaku
EP 0743768	E.U.	11/20/1996	Narahashi
6,088,406	U.S.	7/11/2000	Suzuki 406

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface	August 1995	American National Standards Institute	T1.413-1995
PAR Reduction Without Noise Enhancement	9/22/1997	T1E1.4 Technical Subcommittee Working Group	Djokovic
TI.413 Issue 2: Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface	6/5/1998	American National Standards Institute	T1-413-1998

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Complementary Series	April 1961	M.J.E. Golay, IRE Trans. on Information Theory	Golay
A New Phasing Scheme for Multitone Signal Systems to Reduce Peak-to-Average Power Ratio	1997	S. Narahashi and T. Nojima, Elecs. and Commn's in Japan	
A Method to Reduce the Probability of Clipping in DMT-Based Transceivers	October 1996	Mestdagh, D.J.G and P.M.P. Spruyt, IEEE Trans. on Communications	
Reducing the Peak-to-Average Power Ratio of Multicarrier Modulation by Selected Mapping	October 1996	Bauml, R.W. et al., Electronics Letters	
A Novel Peak Power Reduction Scheme for OFDM	1997	Muller, S.H. and J.B. Huber, IEEE	
Network Migration	December 1997	American National Standards Institute	TR-004

Specific combinations that render the asserted claims of the DDE – Family 4 Patent obvious under 35 U.S.C. § 103 using these references are set forth in Exhibits K-01 through K-19. Defendant reserves the right to rely on the references listed above for motivation to combine, the state of the art and/or the background knowledge of one of ordinary skill in the art.

In addition, any of the foregoing anticipatory or secondary prior art references listed above may be combined with any of the prior art of record in the prosecution history of the DDE – Family 4 Patent (and all related patents and applications), or with any prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups’

publications, reports or specifications), to render the asserted claim obvious. Further, any of the foregoing anticipatory or secondary prior art references listed above may be combined with one another to render the asserted claim obvious.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts. The Supreme Court identified in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007), a number of rationales that would support a finding that the asserted claims are obvious:

- A. the Asserted Claims combine prior art elements according to known methods to yield predictable results;
- B. the Asserted Claims involve the simple substitution of one known element for another to obtain predictable results;
- C. the Asserted Claims involve the use of a known technique to improve similar devices (methods, or products) in the same way;
- D. the Asserted Claims apply a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- E. the Asserted Claims involve combinations of prior art references that would have been “obvious to try”—i.e., a person of ordinary skill in the art could have reached the Asserted Claims by choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- F. the Asserted Claims are simply variations of work from one field of endeavor or a different one that would have been prompted based on design incentives or other market forces because the variations were predictable to one of ordinary skill in the art.

KSR, 550 U.S. at 414–18 (rejecting Federal Circuit’s “rigid” application of motivation-to-combine test, and instead espousing “expansive and flexible” approach); *see also* Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg. 57,526 (Oct. 10, 2007). The Supreme Court has also held that a person of ordinary skill in the art is “a person of ordinary creativity, not an automaton,” that a motivation to combine may be simply “common sense,” and that “familiar items

may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *KSR*, 550 U.S. at 420–21. The Supreme Court further held that it is sufficient that a combination of elements was “obvious to try,” holding that, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.” *Id.* at 421. Further, the Federal Circuit has held that a motivation to combine references may be implicit for patents based on improvements. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006). The prior art references identified herein are almost universally within the field of the asserted patents and are directed to similar subject matter within that field. Additionally, any products, devices, or processes described in the references existed and/or were invented before or during the period in which the claimed inventions were developed, providing further motivation to combine them. CommScope reserves the right to rely on forthcoming testimony in this litigation.

One of ordinary skill in the art would have been motivated to combine one or more of the prior art references identified above to arrive at the combination of elements recited in each asserted claim. The suggestion or motivation to modify or combine references for obviousness purposes is provided by the explicit and implicit teachings of the prior art identified by CommScope, the knowledge of one of ordinary skill in the art, and/or the nature of the claimed invention and the problem(s) purportedly being solved. As an initial matter, CommScope notes that each prior art reference is in or relates to the same field. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field or endeavor prompted

variations based on predictable design incentives and/or market forces either in the same field or a different one. The combination of prior art references identified in these contentions would have been obvious because the combinations represent the known potential options with a reasonable expectation of success. Additionally, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art generally. Also, market forces in the industry and the desire to improve features and performance would motivate the addition of features to systems as they become available; become smaller; become less expensive; become more commonly used; provide better performance; reduce costs; size or weight; or predictably achieve other clearly desirable results.

By way of example only, the Patent Trial and Appeal Board has concluded that it would have been obvious for one of skill in the art to combine Stopler and Shively because the combination is the use of a known technique to improve a similar device, method or product in the same way. IPR2016-01021, Paper 44 at 18, 28–35. Similar reasoning applies to any combination of multicarrier communication devices and references teaching phase adjustment or randomization and scrambling techniques. One of skill in the art would have known that multicarrier transmission techniques suffer from the disadvantage of high peak power during transmission from constructive overlap of the subchannels. *See, e.g.*, Bauml at Abstract, 1:46–50; Jones at 5:49–56; T1.413-1998 at p.40. This is particularly true where multiple subchannels carry the same information. The applicant admitted that sending the same data bits on different carriers was a well-known method to decrease bit error rate and further admitted that sending the same data bits on multiple carriers was a known cause of the known problem of high peak-to-average power ratio in a transmission

signal. U.S. Prov. App. Ser. No. 60/164,134 at 1–2. One of skill in the art would have also known that adjusting the phase characteristics of carrier signals in order to scramble the transmission signal was a known method to address high peak-to-average ratio in a transmission signal. For example, Boyd, IEEE Transactions on Circuits and Systems, Vol. Cas-33, No. 10, Oct. 1986, at 1019, explains that the crest factor, or peak to average ratio, of a multitone signal is improved by the use of a random pattern of phases. As a further example, Jones explains that phase scrambling can be used when certain combinations of data symbols will result in an excessive peak to average power ratio. Jones at 5:44-56. As a further example, Williams explains that randomization of constellation points using a pseudo-random number sequence (that can be replicated to derandomize on the receiver side) can be used to prevent undesirable large impulses in a transmission signal that would cause distortion close to the saturation or clipping point. Williams at ¶ 44. The foregoing citations are illustrative only. The prior art, including the prior art references detailed in Exhibits K-01 through K-19 contain ample additional disclosures establishing these points.

When designing a multicarrier system, particularly one in which the same data bits are or may be sent on multiple carriers, one of skill in the art would have known of the peak-to-average ratio issue and looked to other references in the telecommunications field describing how to adjust the phases of the carriers in order to scramble the transmission signal and address the peak-to-average ratio issue. To the extent that any references teaching adjusting the phases of carriers are not explicitly multicarrier systems, one of skill in the art would have understood that the teaching could be applied to each carrier in a multicarrier system in order to adjust the phases of the carriers relative to each other. Combining various references describing how to adjust the phases of the carriers in order to scramble the transmission signal with references teaching a multicarrier communication system in order to address the peak-to-average ratio issue is nothing more than

using a known technique to improve a similar device, method, or product in the same way. Moreover, market forces would have motivated one of skill in the art to make these combinations. As admitted by the applicant, it was known in the art that high peak-to-average ratio can adversely affect power consumption and component requirements. '008 Patent at 2:8–14. In addition, it was known in the art and admitted as known by the applicant that high peak-to-average power ratio can cause signal clipping, which results in transmission errors. *See, e.g.*, T1.413-1998 at p. 40; U.S. Prov. App. Ser. No. 60/164,134 at 1. One of skill in the art would have been well aware of these adverse effects. A skilled artisan would have looked for ways to address the peak-to-average power ratio issue to mitigate those adverse effects and would have known that phase scrambling of the carriers provided a known solution.

The motivation to combine references and specific illustrative references used above are exemplary only, and should not be used to limit these disclosures. There would have been substantial motivation to combine the prior art references prior to the invention date, and CommScope reserves the right to and intends to supplement the foregoing with expert and other testimony. More detailed bases for the motivation to combine specific references will be set forth in CommScope's invalidity charts and expert report(s) on invalidity.

CommScope reserves the right to amend and supplement these contentions, including as to § 102(f), as further information and discovery are obtained including, in particular, with regard to the alleged conception and reduction-to-practice of the patents-in-suit.

B. INVALIDITY UNDER 35 U.S.C. § 112

CommScope lists below exemplary grounds upon which the asserted claim is invalid for failure to meet one or more requirements of 35 U.S.C. § 112. A more detailed basis for CommScope's written description, enablement, and indefiniteness defenses will be set forth in CommScope's expert report(s) on invalidity. Furthermore, CommScope has not yet had an

opportunity to conduct full discovery regarding invalidity (e.g., inventor depositions, etc.). CommScope has therefore been unable to fully evaluate and formulate these invalidity contentions. CommScope reserves the right to supplement and/or amend these contentions based on § 112. Such supplementation and/or amendments may include, but are not limited to, invalidity contentions based on indefiniteness, lack of written description, and/or lack of enablement should the claim be construed under 35 U.S.C. § 112 ¶ 6.

1. Invalidity Under 35 U.S.C. § 112 ¶ 1

35 U.S.C. § 112 ¶ 1 requires that the specification contain a written description of the invention. “[T]he hallmark of written description is disclosure.” *Boston Scientific Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361–62 (Fed. Cir. 2011) (citation omitted). The test for whether a specification adequately describes an invention is “whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. . . . [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. . . . [I]t is a question of fact.” *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Boston Scientific*, 647 F.3d at 1362.

The enablement requirement of § 112 demands that the patent specification enable “those skilled in the art to make and use the full scope of the claimed invention without ‘undue experimentation.’” *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). “[T]he scope of the claims must be less than or equal to the scope of the enablement.” *Nat’l Recovery Tech., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999).

The asserted claim of the DDE – Family 4 Patent is invalid because the patent specification does not include sufficient description of the subject matter claimed, and the manner and process

of using it, in such full, clear, concise, and exact terms as to enable any person of ordinary skill in the art to which it pertains to make and use the claimed subject matter without undue experimentation. In addition, the specification to which TQ Delta apparently seeks priority does not describe the full scope of each asserted claim with particularity, thereby setting forth insufficient detail to allow one of ordinary skill in the art to understand what is claimed and to recognize that the inventor(s) invented what is claimed. By way of example, and without limitation, at least the following elements are not enabled and/or fail to meet the written description requirement of § 112:

- “a multicarrier modulation transceiver [a multicarrier system including a first transceiver] that uses [a transmission signal having] a plurality of carrier signals for modulating an input bit stream” (’008 Patent, claim 14)
- “combining the phase shift computed for each respective carrier signal with the phase characteristic of that carrier signal to substantially scramble the phase characteristics of the plurality of carrier signals” (’008 Patent, claim 14)
- “wherein multiple carrier signals corresponding to the scrambled carrier signals are used by the first transceiver to modulate the same bit value” (’008 Patent, claim 14)

The asserted claim is invalid because it fails to meet the enablement and/or written description requirements of § 112.

The accused products do not infringe the asserted claims of the DDE – Family 4 Patent based on a proper interpretation of the scope of those claims. To the extent the asserted claims of the DDE – Family 4 Patent may eventually be construed so broadly as to cover the accused products, such a construction (or constructions) would render asserted claims of the DDE – Family

4 Patent invalid for failure to meet the requirements of § 112 ¶ 1.

2. Invalidity Under 35 U.S.C. § 112 ¶ 2

Claims are indefinite under 35 U.S.C. § 112 ¶ 2 when they “fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014). To the extent an asserted apparatus claim includes both apparatus and method limitations, that claim is invalid for indefiniteness under § 112 ¶ 2 because it fails to identify or notify the public of what constitutes direct infringement. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1383–84 (Fed. Cir. 2005).

The asserted claim of the DDE – Family 4 Patent is also invalid because it fails to particularly point out and distinctly claim the subject matter that the purported inventors claimed. CommScope contends that a person of ordinary skill in the art to which the claimed subject matter pertains would not understand the scope of the asserted claim when read in light of the specification. By way of example, and without limitation, at least the following claim terms are indefinite under § 112:

- “substantially scramble the phase characteristics of the plurality of carrier signals”
(’008 Patent, claim 14)
- “multiple carrier signals corresponding to the scrambled carrier signals are used
by a the first multicarrier transceiver to modulate the same bit value” (’008 Patent,
claim 14)

The asserted claim is invalid because it fails to particularly point out and distinctly claim the subject matter that the applicants regard as their invention.

Further, the asserted claim is invalid under § 112 because it purports to claim both an apparatus and a method of using the apparatus. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*,

430 F.3d 1377 (Fed. Cir. 2005). CommScope reserves the right to supplement and/or amend its contentions.

IX. INVALIDITY CONTENTIONS FOR DDE – PATENT FAMILY 6

A. INVALIDITY UNDER 35 U.S.C. § 102 AND/OR 35 U.S.C. § 103

In accordance with P. R. 3-3(b) and (c), the asserted claims of the '835 Patent and the asserted claims of the '112 Patent (the “DDE – Family 6 Patents”) are anticipated and/or rendered obvious by at least the following references:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
2002/0080867	U.S.	6/27/2002	Abbas
7,428,669	U.S.	9/23/2008	Cioffi 669
5,699,365	U.S.	12/16/1997	Klayman
6,700,881	U.S.	3/2/2004	Kong
2003/0174764	U.S.	9/18/2003	Mahany
2002/0172188	U.S.	11/21/2002	Wunsch

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Asymmetric Digital Subscriber Line Transceivers 2	6/13/2005	International Telecommunications Union – Telecommunication Standardization Sector	G.992.3
SC-060: G.gen, G.dmt.bis, G.lite.bis: Protocol for On-	August 2001	International Telecommunications Union –	SC-060

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
Line Reconfiguration of ADSL		Telecommunication Standardization Sector	
Asymmetric digital subscriber line transceivers	6/22/1999	International Telecommunications Union – Telecommunication Standardization Sector	G.992.1

The patents, publications, and references identified above qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g). The charts identified as Exhibits L-01 through L-12 and M-01 through M-03 demonstrate how the asserted claims of the DDE – Family 6 Patents are anticipated and/or rendered obvious by the references above. Each chart identifies certain prior art to the DDE – Family 6 Patents and identifies at least one citation in the prior art reference where each claim element of the asserted claims is disclosed. Though the charts provide illustrative citations to where each claim element may be found in the prior art, the cited references may contain additional disclosures of each claim element as well, and CommScope reserves the right to assert that any claim element is disclosed in other portions of the cited references. In addition, CommScope identifies, and incorporates here by reference, all prior art of record in the prosecution history of the DDE – Family 6 Patents (and all related patents and applications), and all prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups' publications, reports, or specifications), any of which may anticipate and/or render the asserted claims of the DDE – Family 6 Patents obvious. Additional evidence regarding the features and elements of prior art references may be provided by witness testimony, or by

additional documents and materials describing the prior art, that may be identified through the course of ongoing discovery and investigation.

To the extent that a reference above is found to be missing a limitation of the asserted claims of the DDE – Family 6 Patents, any one of the prior art references identified above may be combined with any one or more of the following references, all of which qualify as prior art under 35 U.S.C. §§ 102(a), 102(b), 102(e), and/or 102(g), to render the asserted claims of the DDE – Family 6 Patents obvious under 35 U.S.C. § 103:

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
7,940,798	U.S.	5/10/2011	Puputti
6,182,264	U.S.	1/30/2001	Ott
7,706,287	U.S.	4/27/2010	Tanaka
7,343,543	U.S.	3/11/2008	Mantha
7,418,240	U.S.	8/26/2008	Hsu
7,372,901	U.S.	5/13/2008	Holcomb
7,257,764	U.S.	8/14/2007	Suzuki
7,197,067	U.S.	3/27/2007	Lusky
7,181,177	U.S.	2/20/2007	Pauli
7,170,432	U.S.	1/30/2007	Ettorre
7,024,596	U.S.	4/4/2006	Xin
6,983,414	U.S.	1/3/2006	Duschatko
6,982,964	U.S.	1/3/2006	Beering
6,928,603	U.S.	8/9/2005	Castagna

Patents and Patent Applications			
Patent or Application No.	Country of Origin	Date of Issue or Publication	Short Cite
6,772,388	U.S.	8/3/2004	Cooper
6,732,323	U.S.	5/4/2004	Mitlin
6,477,669	U.S.	11/5/2002	Agarwal
6,266,348	U.S.	7/24/2001	Gross
6,067,646	U.S.	5/23/2000	Starr
5,907,563	U.S.	5/25/1999	Takeuchi
5,828,677	U.S.	10/27/1998	Sayeed
5,638,384	U.S.	6/10/1997	Hayashi
5,546,411	U.S.	8/13/1996	Leitch
5,436,917	U.S.	7/25/1995	Karasawa
5,392,299	U.S.	2/21/1995	Rhines
4,677,622	U.S.	6/30/1987	Okamoto
4,644,544	U.S.	2/17/1987	Furaya
4,541,091	U.S.	9/10/1985	Nishida
4,716,567	U.S.	12/29/1987	Ito
2007/0258487	U.S.	11/8/2007	Puputti
2003/0193889	U.S.	10/16/2003	Jacobsen
2002/0041570	U.S.	4/11/2002	Ptasinski
2001/0022810	U.S.	9/20/2001	Joo
EP 0696108 (A1)	E.U.	2/7/1996	
EP 0923821(B1)	E.U.	6/23/1999	

Publications			
Title	Date of Publication	Author and/or Publisher	Short Cite
HomePlug 1.0 Powerline Communication LANs – Protocol Description and Performance Results version 5.4	2000	M.K. Lee, Int’l Journal of Communication Systems	Lee
Improving I/O Performance of Multimedia Servers	8/1/2001	Pal Halvorsen, University of Oslo, Norway	Halvorsen
Turbo Coded OFDM System for Video Terrestrial Broadcasting	2/11/2003	Mauro Lattuada, LTS3-ITS-STI EPFL Ecublens, 1015, Switzerland	Lattuada

Specific combinations that render the asserted claims of the DDE – Family 6 Patents obvious under 35 U.S.C. § 103 using these references are set forth in Exhibits L-01 through L-12 and M-01 through M-03. CommScope reserves the right to rely on the references listed above for motivation to combine, the state of the art and/or the background knowledge of one of ordinary skill in the art.

In addition, any of the foregoing anticipatory or secondary prior art references listed above may be combined with any of the prior art of record in the prosecution history of the DDE – Family 6 Patents (and all related patents and applications), or with any prior art ITU-T Recommendations or other industry publications (such as ATM Forum, Broadband Forum, or similar groups’ publications, reports or specifications), to render the asserted claims of the DDE – Family 6 Patents obvious. Further, any of the foregoing anticipatory or secondary prior art references listed above may be combined with one another to render the asserted claims of the DDE – Family 6 Patents obvious.

No showing of a specific motivation to combine prior art is required to combine the references disclosed above and in the attached charts. The Supreme Court identified in *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398 (2007), a number of rationales that would support a finding that the asserted claims are obvious:

- A. the Asserted Claims combine prior art elements according to known methods to yield predictable results;
- B. the Asserted Claims involve the simple substitution of one known element for another to obtain predictable results;
- C. the Asserted Claims involve the use of a known technique to improve similar devices (methods, or products) in the same way;
- D. the Asserted Claims apply a known technique to a known device (method, or product) ready for improvement to yield predictable results;
- E. the Asserted Claims involve combinations of prior art references that would have been “obvious to try”—i.e., a person of ordinary skill in the art could have reached the Asserted Claims by choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- F. the Asserted Claims are simply variations of work from one field of endeavor or a different one that would have been prompted based on design incentives or other market forces because the variations were predictable to one of ordinary skill in the art.

KSR, 550 U.S. at 414–18 (rejecting Federal Circuit’s “rigid” application of motivation-to-combine test, and instead espousing “expansive and flexible” approach); *see also* Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg. 57,526 (Oct. 10, 2007). The Supreme Court has also held that a person of ordinary skill in the art is “a person of ordinary creativity, not an automaton,” that a motivation to combine may be simply “common sense,” and that “familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.” *KSR*, 550 U.S. at 420–21. The Supreme Court further held that it is sufficient that a combination of

elements was “obvious to try,” holding that, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.” *Id.* at 421. Further, the Federal Circuit has held that a motivation to combine references may be implicit for patents based on improvements. *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1368 (Fed. Cir. 2006). The prior art references identified herein are almost universally within the field of the asserted patents and are directed to similar subject matter within that field. Additionally, any products, devices, or processes described in the references existed and/or were invented before or during the period in which the claimed inventions were developed, providing further motivation to combine them. CommScope reserves the right to rely on forthcoming testimony in this litigation.

One of ordinary skill in the art would have been motivated to combine one or more of the prior art references identified above to arrive at the combination of elements recited in each of the asserted claims of the DDE – Family 6 Patents. The suggestion or motivation to modify or combine references for obviousness purposes is provided by the explicit and implicit teachings of the prior art identified by CommScope, the knowledge of one of ordinary skill in the art, and/or the nature of the claimed invention and the problem(s) purportedly being solved. As an initial matter, CommScope notes that each prior art reference is in or relates to the same field, high-speed data communications and DSL systems. In addition, it would have been obvious to try combining the prior art references identified above because there were only a finite number of predictable solutions and/or because known work in one field or endeavor prompted variations based on predictable design incentives and/or market forces either in the same field or a different one. For example, flag signals were known by those of ordinary skill in the art, and would have been one

of a finite number of predictable ways to signal a change in transmission parameters in a DSL system during transmission. The combination of prior art references identified in these contentions would have been obvious because the combinations represent the known potential options with a reasonable expectation of success.

Additionally, one of ordinary skill in the art would have been motivated to create combinations identified in these contentions using: known methods to yield predictable results; known techniques in the same way; a simple substitution of one known, equivalent element for another to obtain predictable results; and/or teaching, suggestion, or motivation in the prior art generally. Also, market forces in the industry and the desire to improve features and performance would motivate the addition of features to systems as they become available; become smaller; become less expensive; become more commonly used; provide better performance; reduce costs; size or weight; or predictably achieve other clearly desirable results. One of ordinary skill in the art would have recognized that it would be desirable to be able to change transmission parameters during transmission in response to, for example, a change in data rate, without going through a modem retraining. Those in the industry, and those of ordinary skill in the art would understand that such features may lead to more reliable, high-quality service for customers.

In particular, and for exemplary purposes only, a person of ordinary skill in the art would have been motivated to combine the teachings of G.992.1 and SC-060 for at least the reasons described below. G.992.1 discloses the online reconfiguration of FIP and interleaver parameters through a procedure called Dynamic Rate Adaptation (“DRA”). G.992.1, §§II.1, II.1.1. In the DRA procedure, in order to synchronize reconfiguration of FIP settings between transceivers ATU-C and ATU-R, ATU-R acknowledges a DRA_Swap_Request from ATU-C by sending a DRA_Swap_Reply message. *Id.*, §II.6. If the ATU-C receives the DRA_Swap_Reply, and the

DRA_Swap_Reply indicates that the ATU-R has accepted the proposed timing of the reconfiguration (provided in the swap request), the ATU-C switches at the proposed timing. *Id.*, §II.6. Likewise, if the ATU-R indicated in the DRA_Swap_Reply that it accepted the proposed timing of the reconfiguration, the ATU-R switches to the new parameters at the proposed timing. G.992.1, §II.6. G.992.1 discloses that the DRA_Swap_Reply and other messages of the DRA protocol are “transmitted 5 times for protection against transmission errors,” and that the messages are not acted on by the receiving ATU unless it “has received three identical messages in a time period spanning 5 of that particular message.” *Id.* §§11.1.2, II.2.1. Therefore, one of ordinary skill in the art would understand that, especially in the presence of impulse noise, there could be instances where the ATU-R switches but the ATU-C does not because it does not properly receive and decode the swap reply the required number of times. One of ordinary skill in the art also would have been motivated to improve the reliability of the DRA protocol to protect against this lack of synchronization.

In order to address these shortcomings of G.992.1’s DRA protocol, one of ordinary skill in the art would have looked to the contributions to the relevant ITU working group, SG15/Q4, including SC-060.

SC-060 proposes a unified protocol for numerous forms of on-line reconfiguration (“OLR”). SC-060, §2.1. In the SC-060 protocol, a transceiver requests changes through an OLR Request message. *Id.*, §3. The OLR Request message includes additional parameters not included in the messages disclosed in the DRA protocol. *Id.*, §3.1. The OLR Request message includes Synch Flag Superframe (SFlgSf) and Superframe Delay (SfDly) parameters that, when used in conjunction with the Synch Flag, render the OLR protocol disclosed in SC-060 “extremely robust.” *Id.*, §§3.4, 3.5.

The SFlgSf parameter essentially schedules when the OLR Acknowledge should be sent, further coordinating the parameter switch between the receivers and increasing the efficiency of the OLR protocol. *Id.*, §3.4. The SC-060 OLR protocol is also faster and more efficient because it only requires the transmission of one message and one Synch Flag in order to complete the protocol. SC-060, §3.5.

One of ordinary skill in the art would have been motivated to modify the G.992.1 DRA protocol to incorporate at least the features of SC-060 discussed herein to improve the efficiency and robustness of the protocol. For example, one of ordinary skill in the art would have incorporated into the reconfiguration procedure of DRA in G.992.1 elements disclosed in SC-060 to improve the robustness and efficiency of the protocol including the use of the Synch Flag as the acknowledgement and the use of the SFlgSg and SfDly parameters.

A person of ordinary skill in the art would have been motivated to combine the teachings of G.992.1 with Wunsch for similar reasons. Wunsch proposes a protocol for on-line reconfiguration. Wunsch, ¶[0002]. In Wunsch, a first transceiver sends a request to reconfigure transceiver parameters to a second transceiver. *Id.*, ¶[0057], Fig. 4. The request includes proposed reconfigured transceiver settings, as well as two additional parameters, Synch Flag superframe identification (SFlgSf) and a reconfigure implementation delay (Dly). *Id.*, ¶[0057]. SFlgSf instructs the second transceiver when to send an acknowledgment back to the first transceiver. *Id.*, ¶[0051]. Dly instructs the second transceiver how long after sending the acknowledgment it should wait before switching to the reconfigured transceiver settings. *Id.*, ¶[0055]. The acknowledgment is in the form of a Synch Flag, which “can be readily identified” by the first transceiver. *Id.*, ¶[0049]. The second transceiver then sends the Synch Flag after counting SFlgSf superframes, with the count starting upon receipt of the request to reconfigure. *Id.*, ¶[0051]. Wunsch also

discloses that the Synch Flag is sent over the PMD layer. *Id.*, ¶[0048]. The second transceiver then switches to the reconfigured transceiver settings for transmission after counting $(SFlgSf + 1 + SfDly)$ modulo 256 after sending the Synch Flag. *Id.*, ¶[0059]. The first transceiver looks for the Synch Flag in the specified superframe and upon detection, counts $(SFlgSf + 1 + SfDly)$ modulo 256 superframes before switching to the new transceiver settings for reception. *Id.*, ¶¶[0068], [0069].

Wunsch, published in 2002, specifically discloses that “[i]n current generation ADSL equipment,” even though the acknowledgment message for on-line reconfiguration “is repeated several times in succession to increase the reliability that the message will be correctly received” by the receiving transceiver, “it can be demonstrated in practice that in typical situations, the receiver can miss the ack/comply message.” Wunsch, ¶[0013]. Wunsch explains that in such a situation, one transceiver can switch to the new configuration while the other operates on the original configuration, which “causes errors in the link that degrade performance, often requiring the equipment to leave ShowTime and retrain.” *Id.* Wunsch further explains that the “Sync Flag is defined as a specific bit pattern that is maximally different or near maximally different from the bit pattern of the normal Sync Symbol. This great difference is what provides the improved reliability.” *Id.*, ¶[0019]. Wunsch also explains that utilizing the PMD layer to send the sync flag is more precise than sending a message over the OAM channel. *Id.*, ¶[0020].

Thus, one of ordinary skill in the art would have been motivated to modify the DRA protocol of G.992.1 to incorporate features from Wunsch to improve the reliability and speed of the DRA protocol. For example, one of ordinary skill in the art would have been motivated to use the Synch Flag taught by Wunsch as acknowledgement of the reconfiguration, which would

eliminate the need for the ATU-R to transmit multiple DRA_Swap_Reply messages and for that message to be received by the ATU-C.

With respect to the '112 patent, a person of ordinary skill in the art would have been motivated to combine the teachings of Cioffi and G.992.1 for several reasons. Critically, Cioffi repeatedly refers to “ADSL1” and the “ADSL1 standard,” which Cioffi notes is another name for G.992.1, throughout the specification and incorporates G.992.1 “in its entirety by reference for all purposes.” *See, e.g.*, Cioffi, Abstract, 4:13–15, 4:43–46, 6:31–35, 6:60–62. Cioffi also provides a “specific example following aspects of the ADSL1 standard” of switching to receiving using a second FIP setting including a second codeword size and a second number of parity bytes. *Id.*, 12:39–13:3. Cioffi also indicates that the reconfigurations of FEC settings described throughout its disclosures can be carried out during Showtime, i.e., they are on-line reconfigurations. *See id.*, 20:44–21:5 (Claim 1); 21:47–57 (Claim 12).

However, Cioffi does not describe in detail how transceivers in the ADSL1 system would communicate with each other in order to implement the reconfiguration of FEC parameters. For example, Cioffi does not explain how a transceiver can propose a new configuration to the other or how the transceivers know when to switch to the new FEC parameters such that they switch at the same time. Therefore, it would have been natural for a person of ordinary skill in the art, upon reading the disclosure of Cioffi, to have looked to G.992.1 to determine how to carry out the FEC reconfigurations disclosed within. In particular, because Cioffi indicates that the reconfigurations are performed during Showtime, one ordinary skill in the art would have considered the on-line reconfiguration protocol disclosed in Appendix II of G.992.1. Accordingly, one of ordinary skill in the art would have been motivated to combine the broad disclosures of on-line reconfiguration

of FEC parameters of ADSL transceivers of Cioffi with the detailed description the messaging and communications protocol for on-line reconfigurations of FEC parameters of G.992.1.

The motivation to combine references is exemplary only, and should not be used to limit these disclosures. There would have been substantial motivation to combine the prior art references prior to the invention date, and CommScope reserves the right to and intends to supplement the foregoing with expert and other testimony. More detailed bases for the motivation to combine specific references will be set forth in CommScope's expert report(s) on invalidity.

To the extent that TQ Delta raises any secondary considerations of non-obviousness, for example, in its expert reports, CommScope reserves the right to address any such considerations, including by taking discovery on those issues and supplementing and/or amending its invalidity contentions.

CommScope does not presently have any disclosures under 35 U.S.C. § 102(f). CommScope reserves the right to amend and supplement these § 102(f) contentions as further information and discovery are obtained including, in particular, with regard to the alleged conception and reduction-to-practice of the patents-in-suit.

B. INVALIDITY UNDER 35 U.S.C. § 112

CommScope lists the below grounds upon which the asserted claims of the DDE – Family 6 Patents are invalid for failure to meet one or more requirements of 35 U.S.C. § 112. A more detailed basis for CommScope's written description, enablement, and indefiniteness defenses will be set forth in CommScope's expert report(s) on invalidity. CommScope reserves the right to supplement and/or amend these contentions based on § 112. Such supplementation and/or amendments may include, but are not limited to, invalidity contentions based on indefiniteness, lack of written description, and/or lack of enablement.

1. Invalidity Under 35 U.S.C. § 112 ¶ 1

35 U.S.C. § 112 ¶ 1 requires that the specification contain a written description of the invention. “[T]he hallmark of written description is disclosure.” *Boston Scientific Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1361–62 (Fed. Cir. 2011) (citation omitted). The test for whether a specification adequately describes an invention is “whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. . . . [T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. . . . [I]t is a question of fact.” *Ariad Pharms., Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc); *Boston Scientific*, 647 F.3d at 1362.

The enablement requirement of § 112 demands that the patent specification enable “those skilled in the art to make and use the full scope of the claimed invention without ‘undue experimentation.’” *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1365 (Fed. Cir. 1997) (quoting *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993)). “[T]he scope of the claims must be less than or equal to the scope of the enablement.” *Nat’l Recovery Tech., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999).

The asserted claims of the DDE – Family 6 Patents are invalid because the patent specification lacks sufficient description of the subject matter claimed, and the manner and process of using it, in such full, clear, concise, and exact terms as to enable any person of ordinary skill in the art to which it pertains to make and use the claimed subject matter without undue experimentation. In addition, the full scope of each claim was not described with particularity in the specification to which priority is apparently sought, thereby setting forth insufficient detail to allow one of ordinary skill in the art to understand what is claimed and to recognize that the inventor(s) invented what is claimed. By way of example, and without limitation, at least the

following elements are not enabled and/or fail to meet the written description requirement of § 112:

- “the switching occurs on a pre-defined forward error correction codeword boundary following the flag signal” (’835 Patent, claims 8 and 10)
- “interleaver parameter value” (’835 Patent, claims 8 and 10)
- “FIP [setting/value]” (’835 Patent, claims 8 and 10)
- “the switching to receiving using the second FEC codeword size and the second number of FEC coding parity bytes does not cause bit errors or service interruption” (’112 Patent, claim 10)

The asserted claims of the DDE – Family 6 Patents (and all other claims in the asserted patents that include or depend from any claims that include any of the above limitations) are invalid because they fail to meet the enablement and/or written description requirements of § 112.

CommScope’s accused products do not infringe the asserted claims of the DDE – Family 6 Patents based on a proper interpretation of the scope of those claims. To the extent that the asserted claims of the DDE – Family 6 Patents may eventually be construed so broadly as to cover the accused products, such a construction would render the asserted claims of the DDE – Family 6 Patents invalid for failure to meet the requirements of § 112 ¶ 1.

2. Invalidity Under 35 U.S.C. § 112 ¶ 2

The asserted claims of the DDE – Family 6 Patents are also invalid because they fail to particularly point out and distinctly claim the subject matter that the purported inventors claimed. CommScope contends that a person of ordinary skill in the art to which the purported invention pertains would not understand the scope of each claim when read in light of the specification. By

way of example, and without limitation, at least the following claim terms are indefinite under § 112:

- “configurable to” (’835 Patent, claims 8 and 10)
- “pre-defined forward error correction boundary” (’835 Patent, claims 8 and 10)
- “operable to” (’112 Patent, claim 8)
- “associated with” (’112 Patent, claims 11 and 12)

The asserted claims of the DDE – Family 6 Patents (and all other claims in the asserted patents that include or depend from any claims that include any of the above limitations) are invalid because they fail to particularly point out and distinctly claim the subject matter that the applicants regard as their invention. Moreover, in the Delaware litigation, TQ Delta repeatedly altered its position as to the potential meaning of “pre-defined forward error correction boundary,” indicating that the scope and meaning of the limitation is indefinite.

Further, the asserted claims of the DDE – Family 6 Patents are invalid under § 112 because they purport to claim both an apparatus and a method of using the apparatus. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377 (Fed. Cir. 2005). For example, claim 8 of the ’835 Patent recites an apparatus, then recites steps performed by the apparatus, such as “transmit signal using a first FIP setting,” “transmit a flag signal,” and “switch to using for transmission, a second FIP setting following transmission of the flag signal.” Moreover, to the extent that the claimed functions are accomplished merely using software, no specific algorithm is disclosed to perform the claimed function. And to the extent that TQ Delta’s Asserted DDE – Family 6 Claims do not invoke 35 U.S.C. § 112, ¶ 6 (pre-AIA), those claims are invalid for merely claiming the function of an apparatus. Thus, Asserted DDE – Family 6 Claims are invalid as indefinite under § 112 ¶ 2.

X. INCORPORATION BY REFERENCE OF NOKIA DEFENDANTS' INVALIDITY CONTENTIONS

To the extent that TQ Delta has accused Defendants Nokia of America Corporation, Nokia Corporation, Nokia Solutions and Networks Oy (collectively, the “Nokia Defendants”) of infringing the same patents and claims as are asserted against CommScope, and the Nokia Defendants have provided invalidity contentions corresponding to those patents and claims, CommScope incorporates the Nokia Defendants’ contentions by reference with respect to the overlapping patents and claims. CommScope understands that this overlap encompasses the following patents and claims:

Patent	Asserted Claim(s)
7,570,686	17, 18, 19, 36, 37, 38, 40
7,844,882	9, 13, 14, 15
8,090,008	14
8,468,411	10, 11, 17, 18, 19, 25
8,937,988	16, 22
9,094,348	1, 2, 3, 4, 9, 10, 11, 12
9,154,354	10, 11, 12
9,485,055	11, 17, 19,
10,567,112	8, 10, 11, 12, 14
10,833,809	1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 20, 22, 23, 24, 25, 27

XI. P. R. 3-4 DOCUMENT PRODUCTION

A. Documents Related to Accused Instrumentalities Under P. R. 3-4(a)

With the express reservations of rights to supplement its P. R. 3-4(a) disclosures, and based on its current understanding of CommScope's infringement contentions, CommScope is producing today, and will continue to supplement if necessary, documentation, Bates labeled COMMSCOPE012879–COMMSCOPE013337, sufficient to show the relevant structure and operation of the accused devices.

B. Documents Related to Prior Art Under P. R. 3-4(b)

Pursuant to P. R. 3-4(b), CommScope is producing concurrently with these Invalidity Contentions documents Bates labeled COMMSCOPE000002–COMMSCOPE012878, reflecting the prior art references identified above and/or in the attached charts in connection with defendants' P. R. 3-3(a) disclosures.

Dated this 13th day of January, 2022

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned certifies that on this 13th day of January, 2022, all counsel of record are being served with a copy of this document via electronic mail.

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